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CONFEDERATED SALISH AND KOOTENAI TRIBES
OF THE FLATHEAD RESERVATION
MONTANA

FLATHEAD RESERVATION

DRAFT

FOREST MANAGEMENT PLAN 1982-1991

Compiled and Edited

by

ARNOLD J. BROWNING

SEPTEMBER 1986

PREFACE

The objective of forest management planning is to provide guidance required to effectively manage the forest resources of the reservation. Effective forest management is management that accomplishes the goals and objectives of the Confederated Salish and Kootenai Tribes and the Bureau of Indian Affairs. Management policy and objectives of the Bureau of Indian Affairs are stated in Title 25 Code of Federal Regulations and 53 Bureau of Indian Affairs Manual. Specific management objectives and goals were reviewed and approved by the Tribal Council and are stated in Chapter III of this plan.

The Forest Management Plan provides a description of the forest resources, management regimes, and resource prescriptions. The Action Plan, Chapter IV, outlines the course of action for the 1982-1991 plan period. The Action Plan contains details concerning specific forestry programs and a Timber Sale Plan which proposes when and where the timber harvesting will occur during the next five years.

Forest Management planning involves the preparation of four major documents: 1) forest inventory analysis, 2) forest history, 3) forest management plan, and 4) environmental assessment. Each of these components have been prepared as separate documents due to their length and complexity. Since a detailed forest history was completed in 1975, only an update of forest activities since 1975 is included in this plan.

The environmental assessment for this plan has been prepared under a contract with the University of Montana. The University team has evaluated the proposed alternative for forest management issues of concern to the Tribes.

The forest management plan contains four chapters:

I. Reservation Setting
II. Summary
III. Management Plan
IV. Action Plan

The Forest Management Plan is not a directive but a flexible guideline that will be revised to comply with changes in Tribal policy and objectives and to reflect changes in the forest.

Further information about the Plan can be obtained by writing to the Superintendent, Flathead Agency, P.O. Box A, Pablo, Mt. 59855 or by calling the Forest Manager at (406) 675-2700.

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ACKNOWLEDGMENTS

We wish to express our sincere appreciation to the many people who have contributed to the Draft Forest Management Plan by writing portions of the documents, reviewing earlier drafts, and offering constructive criticism to improve the draft plan.

B.I.A. Flathead Agency staff that have contributed to the draft plan include:

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Other BIA staff that have contributed to the plan include:

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Jim Paro, Natural Resources Department Head
Ginger Thomas, Tribal Fisheries Biologist
Peg Rogers Trochlell, Water Use Analyst

We are especially grateful to the U.S. Forest Service for their review of early drafts of the Plan and contributions to the soils and water portions of the plan.

Bill Basko, Soil Scientist, Flathead National Forest
Bill Magneson, Forester, Coop Forest and Pest Management
Phyllis Snow, Hydrologist, Flathead National Forest

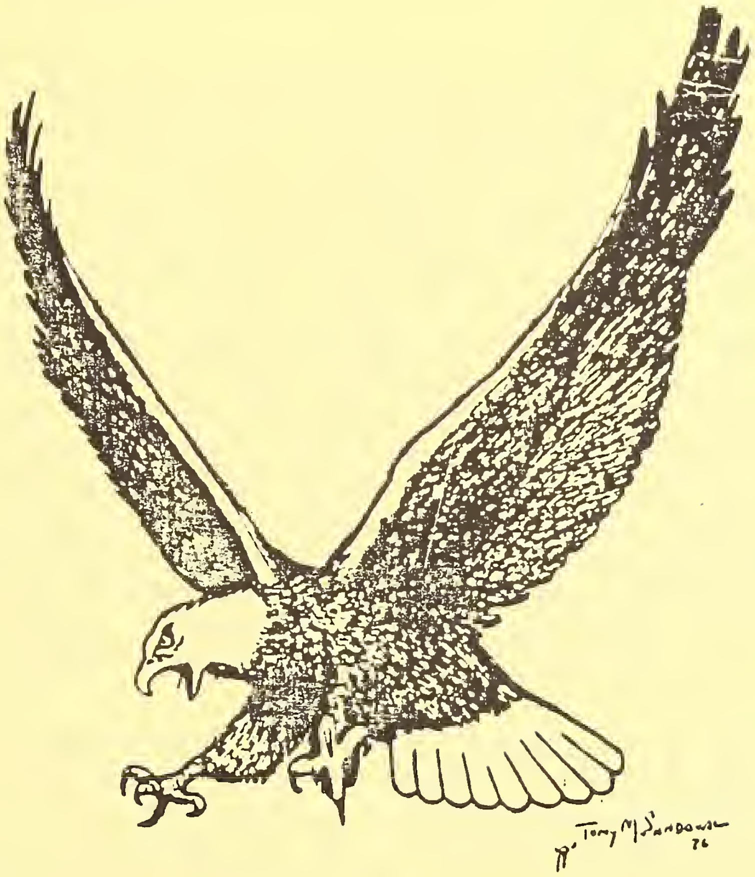
We thank Dean Ben Stout and the scientists at the School of Forestry of the University of Montana for the Environmental Assessment of the Plan and constructive comments on the draft plan.

We thank Peggy Haggard for the many hours spent typing early drafts of the document and Diane Hogan for the excellent job of word processing the draft plan.

Arnold J. Browning
Editor

Chapter I

RESERVATION SETTING



I. RESERVATION SETTING

A. Location

The Flathead Indian Reservation is located in Northwestern Montana approximately 80 miles south of the Canadian border and 40 miles east of Idaho. Its form is roughly that of a trapezoid, about 36 miles west to east and 54 miles from north to south at its longest extremity. The boundaries of the Reservation include portions of Lake, Flathead, Sanders, and Missoula Counties. On the north, the Reservation is bounded approximately by the 47 53' North Latitude, on the east by the Mission Mountains, on the west by the Cabinet Range and on the south by the Coeur d'Alene Mountain Range. The northern boundary bisects Flathead Lake. The forested area is shown in Figure I-1.

B. Topography

The Reservation exhibits great diversity in form and relief. On the east side is the towering Mission Range with deep narrow canyons, sharp angular ridges, barren peaks and snowfields. Its elevation spans 6,000 to 10,000 feet. A portion of the Cabinet Range forms the western boundary. These mountains are timbered, moderately rugged, and range from 4,000 to 7,000 feet in elevation. A portion of the Coeur d'Alene Range forms the southern boundary and is characterized by deep canyons and forests interspersed with talus slopes, rock ledges and barren cliffs. Several peaks area above timberline, the highest being Squaw Peak at 8,000 feet elevation. Through the center of the Reservation a low range of mountains exists that could be referred to as the Little Bitterroot Mountains, and are composed of such individual land marks as Hog Heaven, Irvine, Garceau and Ferry Basin. These mountains are rolling hills with grassy lower slopes and timbered ridge tops.

Between the above mentioned ranges are four distinct valleys, which compose what is generally called the Lower Flathead Valley. Mission Valley is bounded on the north by Flathead Lake, on the east by the Mission Range, on the south by the National Bison Range and on the west by the Little Bitterroot Mountains. This fertile valley is interwoven with irrigation canals and contains the Pablo, Lower Crow, Horte, Ninepipe and Kicking Horse Reservoirs. Hemmed in by the Little Bitterroot Mountains and the Cabinet Range are the Little Bitterroot and Camas Prairie Valleys. The Jocko Valley is located in the south central portion of the Reservation.

Drainage features include Flathead Lake, and the Flathead, Little Bitterroot, and Jocko Rivers. Flathead Lake is 27 miles in extreme length, 16 miles in extreme width and is approximately 188 square miles in surface area. The lower half of this lake is within the Reservation boundary. From the southern tip of the Lake, the Flathead River winds its way south for about thirty-five miles, then turns abruptly westward to flow about 20 miles to the Reservation boundary.

FORESTED AREA OF THE FLATHEAD INDIAN RESERVATION

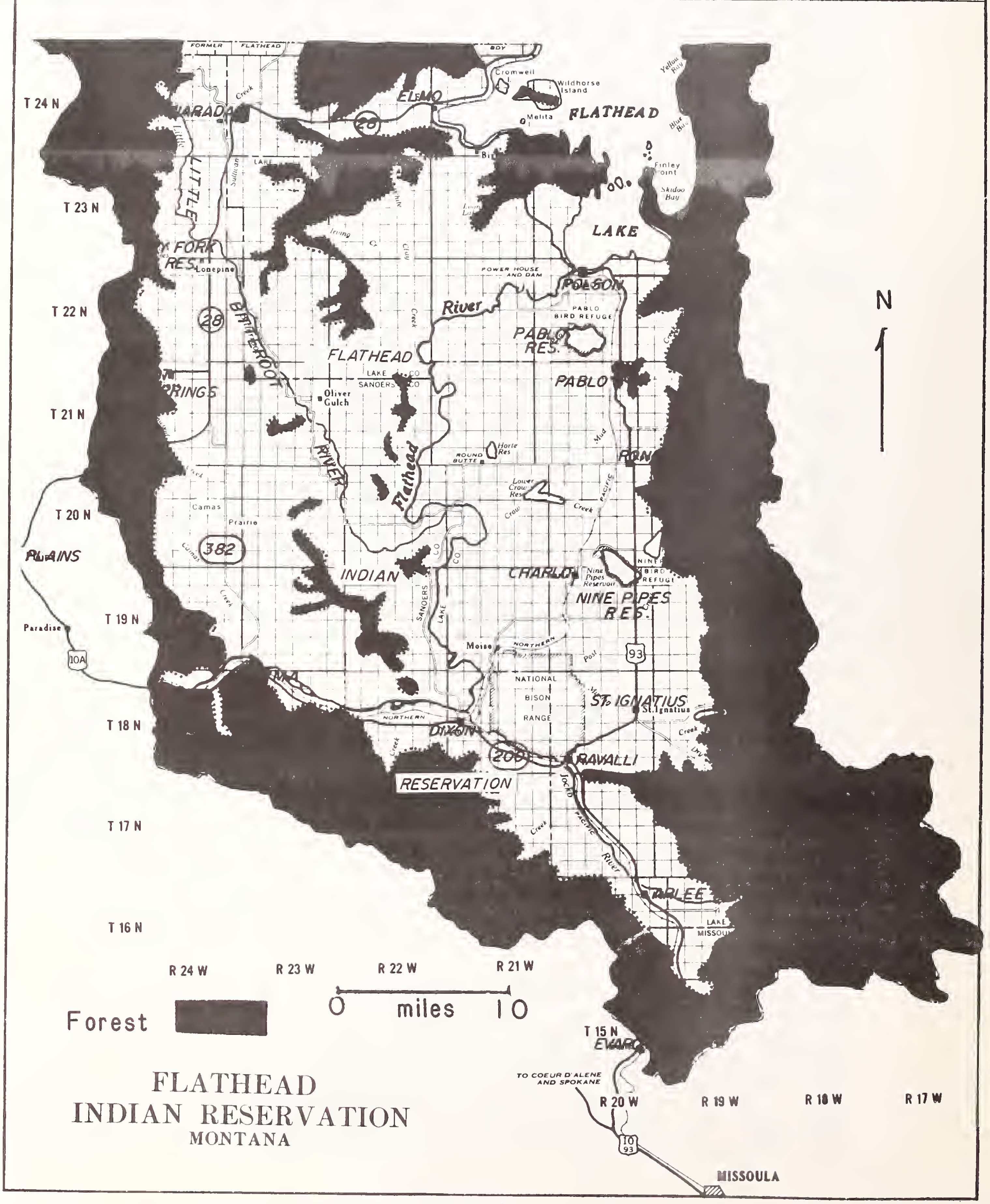


Figure I — 1

The Little Bitterroot River drains the northwest corner and west side of the Reservation and empties into the Flathead River about twenty-five miles south of the Flathead Lake outlet. The Jocko River originates in the extreme southeast portion of the Reservation and empties into the Flathead River at Dixon, Montana. The Flathead River provides drainage for Flathead Lake and the west face of the Mission Range through small tributary streams such as North and South Crow Creeks, Post Creek, Ashley Creek and Mission Creek.

View of Mission Mountains and Indian Bay on Flathead Lake.

C. Climate

The climate during summer months is generally dry with occasional light rains and dry lightning storms. Normal temperatures range between 85 and 95 degrees Fahrenheit, with infrequent highs of 100 to 105 degrees. Winter months are generally mild except for an infrequent cold front that will drop the temperature to a minus 20 or 30 degrees Fahrenheit. These cold fronts usually last from three to ten days.

Daily weather is influenced by frontal systems moving eastward from the Pacific Coast and southerly from the Alaskan and Canadian mainlands. The fronts from Alaska and

Canada are most frequent during winter months.

Annual precipitation ranges from 13 inches in the vicinity of Niarada, Montana, to over 100 inches at the highest elevations of the Mission Range. Average precipitation is approximately 20 inches per year in the forest zone. A precipitation map (Appendix I) shows precipitation patterns for the Reservation.

Above 5,000 feet elevation, about 70-75 percent of the precipitation falls as snow. At lower elevations, at least half is rainfall. The heaviest runoff occurs in April, May, and June.

The relatively short growing season on the Reservation lasts from May to September. At high elevations the season is somewhat shorter. Occasional frost or snow can occur in any month but is rare during July.

Chapter II

SUMMARY OF MANAGEMENT PLAN

II. SUMMARY

A. Introduction

There are two major parts to the Plan: Chapter III Management Plan and Chapter IV Action Plan. Chapter III Management Plan describes the purpose of the Plan, the planning process, goals and objectives, and general forest management policy. Chapter IV Action Plan describes each of the functional areas of forest management and specific policy for each of these program areas.

Three companion documents have been prepared to accompany the Plan; the forest inventory analysis, the forest history, and the environmental assessment. Since a detailed forest history was completed in 1975, only an update of forest activities since 1975 is included in this plan. The environmental assessment for this plan was prepared by the University of Montana. The University scientists evaluated the proposed alternative for forest management issues of concern to the Tribes.

B. Chapter III. Management Plan

1. Purpose and Need

The purpose of the Forest Management Plan is to provide long-term direction for managing forest resources on the Reservation.

2. Management Planning Process

The management planning process is shown in Figure III-1 on page 13. Forest management plans are to be revised every ten years. On January 25th, 1982, the Bureau of Indian Affairs (BIA) Branch of Forestry met with the Tribal Council to discuss goals, objectives, and basic forest policy for the 1982-1991 Forest Management Plan. During the summer of 1982 a scoping committee met to identify forest management issues and concerns. Alternatives were developed and in the fall of 1982 the Council reviewed and approved the goals and objectives and selected preferred alternatives for the major management concerns. The Branch of Forestry, with assistance from other branches and agencies, then prepared the draft plan.

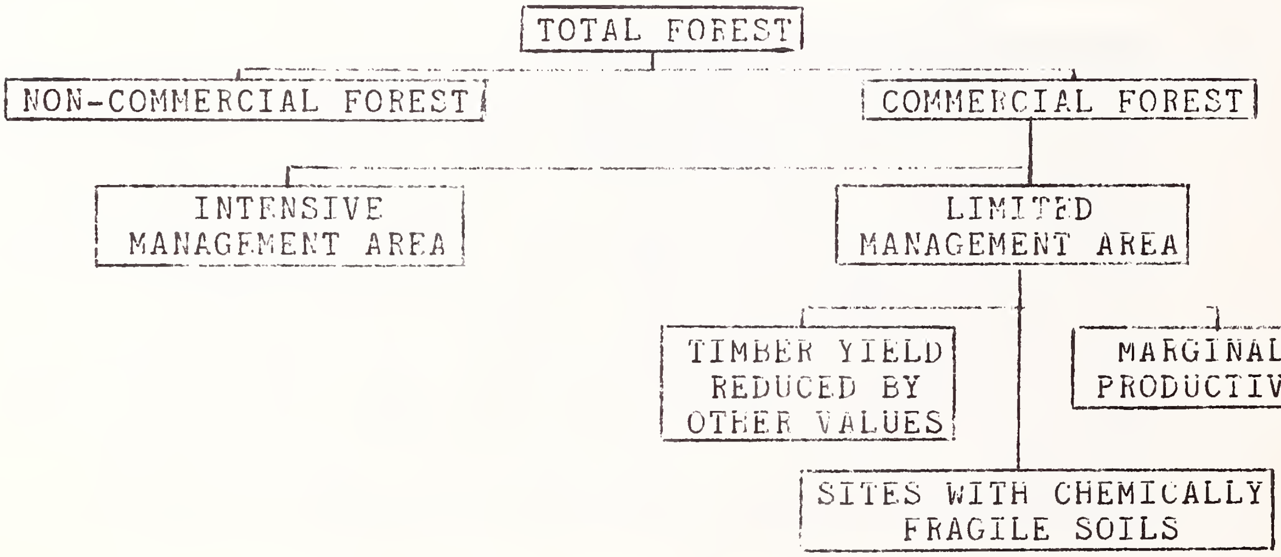
Since 1982 many revisions to the draft plan have been made to reflect the increased emphasis on multiple use management, current Tribal Council direction, and incorporate recommendations by the University of Montana scientists who prepared the environmental assessment (EA) for the Plan.

On February 28, 1986 the Tribal Council reviewed four alternative levels of harvest ranging from an estimated 65,000,000 board feet to 14,000,000 board feet annually. The Council selected alternative C, the 39,000,000 board feet per year, Non-Timber Emphasis Alternative. This alternative includes the provisions for multiple use management that interdisciplinary teams have developed during the last two years. This alternative provides for salvage cutting only in the temporary even-aged component, approximately 74,000 acres. The Council felt that the visual impacts of harvesting these stands was unacceptable even though these stands are heavily diseased and need harvesting and regeneration. Selective logging is not a viable alternative for these stands since the disease would increase with partial cutting.

Additional changes to the draft plan will be made after the Plan and EA have been reviewed by the public.

3. Management Objectives and Goals
The management objectives and goals are listed in Section III.C. page 15. The major goal is to manage the forest resources on a sustained yield basis with a policy of multiple use.

4. Forest Management Policy
The basic framework for classifying forest land for timber planning purposes on the Flathead Reservation is illustrated below.


TOTAL FOREST
NON-COMMERCIAL FOREST
COMMERCIAL FOREST
INTENSIVE MANAGEMENT AREA
LIMITED MANAGEMENT AREA
TIMBER YIELD REDUCED BY OTHER VALUES
MARGINAL PRODUCTIVITY
SITES WITH CHEMICALLY FRAGILE SOILS

This section discusses the general policies for the management of the types of forest areas listed above, covering both the type of management (even-aged or uneven-aged) and the intensity of management.

5. Regulation and the Allowable Annual Cut (AAC)
The allowable annual cut (AAC) has been determined based on attaining a regulated forest condition by the year 2042 and based on the management alternatives selected by the Tribal Council in 1982 and modified by the Council in 1986. Table III-4 on page 31, provides a summary of the AAC by management component. The proposed AAC may be reduced during the management plan review period to

provide additional emphasis on non-timber forest resources.

6. Timber - Silvicultural and Management Systems for the Commercial Forest

   The management systems for the commercial forest are uneven-aged, even-aged, and temporary even-aged. Uneven-aged management is the application of a harvest method that creates stands containing three or more distinct age/size classes. Uneven-aged management is accomplished through individual tree selection or group selection methods. Uneven-aged management is applied primarily to healthy timber stands occurring on mid to lower elevation forest sites. Approximately 192,000 acres, or 60 percent of the commercial forest is in uneven-aged management.

   As the name implies, even-aged management is the application of harvest (silvicultural) methods (clearcut, seed tree, and shelterwood) that result in stands with trees all about the same age. Even-aged management is applied mostly in the higher elevation forest sites. Approximately 56,000 acres, or 17 percent of the commercial forest is in even-aged management.

   Temporary even-aged management is applied to forest lands that have trees that are severely diseased. The condition of these trees is so poor that uneven-aged management is not possible. Once these areas have been regenerated with healthy trees they will be slowly converted to an uneven-aged forest. There are approximately 74,000 acres, or 23 percent of the commercial forest in this component.

   Much of the temporary even-aged management area is in limited management status due to the visual resource.

   In limited management areas, forest resources such as wildlife, water, or aesthetics take precedence over timber. Timber harvest is only permitted when its adverse impacts can be adequately mitigated.

7. Water

   Forested watersheds on the Reservation provide water for many purposes. The most common are irrigation, drinking, fisheries, and hydro-electric power. Timber harvest is adjusted by limiting the size of the timber harvest units, scheduling cutting, using uneven-aged management, and managing streamside zones to maintain high quality water from forested watersheds.

8. Soils

   Maintaining forest soil productivity is an important goal of this management plan. Policies are stated that will protect forest soils from erosion, compaction and

Douglas-fir tree infected with dwarf mistletoe, a parasitic plant that is abundant on 74,000 acres of the commercial forest.

displacement. Soils that will receive special consideration for management have been identified in the Environmental Assessment (University of Montana, 1984).

9. Range

A large percentage of the 335,000 acres of rangeland of the Reservation is in the commercial forest. Most of this rangeland is best suited for use starting in early May and continuing through late October. Grazing is controlled by the use of a permit system.

10. Fish and Wildlife

The fish and wildlife on the Reservation are diverse and contain several rare species. Fish and wildlife are not only important as food sources but also in Tribal cultural and religious life.

Forest management activities affect fish and wildlife by changing their habitat. Inter-disciplinary planning for forest management activities will insure that adequate habitat is provided. Four species listed under the Endangered Species Act (93-205) occur on the Reservation. They are the bald eagle, gray wolf, peregrine falcon, and grizzly bear.

11. Aesthetics
Scenic areas on the Reservation that receive special visual quality consideration include areas viewed from major highways, communities, homesites, and recreational facilities. Special visual quality protection shall be given to the Mission Range, the upper Jocko watershed, the Flathead River, and other areas identified by interdisciplinary (ID) planning teams.

12. Recreation
Recreational activities in the forest include hunting, fishing, hiking, camping, firewood cutting, berry picking, horseback riding, and cultural activities. The Tribal Recreation Program reviews forest management activities and assists the ID Team in planning to insure recreational opportunities are protected and enhanced where possible.

Tribal Wildland Recreation Department trail crew hiking above Terrace Lake in the Mission Mountain Tribal Wilderness.

13. Cultural Resources

Forest management activities will provide for the protection of cultural resources. Requests for cultural clearance will be made through the Agency Environmental Coordinator and submitted to the culture committees for all proposed ground disturbing forest management projects. Cultural surveys will be made by the Flathead Culture Committee and the Kootenai Culture Committee. Mitigation measures will be added to proposed timber sale contracts and sale plans as directed by culture committees to protect cultural resources.

C. Chapter IV. Action Plan

1. Forest Development Program

Forest development administers a wide variety of programs including seedling production, reforestation, site preparation, insect and disease detection and control, thinning, and a number of developmental projects to increase forest productivity. Collectively, these activities require a budget in excess of $500,000.00 yearly. Independent contractors and a staff of both permanent and seasonal Tribal and Bureau people are necessary to complete yearly goals.

The reforestation program includes cone collection, seed extraction, seedling production, outplanting, evaluations, and data base tracking. Three Bureau crawler tractors and support equipment augment both the reforestation and Timber Stand Improvement projects through such activities as snowplowing, road construction, scarification, skidding, and slash disposal. Harvest schedules require 2000-4000 acres of thinning and mistletoe control work annually. The program is responsible for annual insect and disease detection and control projects. Reservation wide aerial and ground reconnaissance provide input to develop a plan of action to meet specific problems.

Several studies related to growth and yield, fertilization, outplanting, tree improvement, and disease control are maintained to answer questions crucial to intensive management.

2. Forest Protection

This section of the Plan discusses protecting the forest from timber trespass and wildfire. The intermingled land ownership on the Reservation contributes to the potential for timber trespass. Measures for trespass prevention are listed.

The Bureau policy is to prevent disasterous fires by giving top priority to fire suppression. Cooperative agreements with other agencies and organizations give the BIA primary protection responsibilities for most lands within the Reservation boundary. The fuels management program is guided by the Flathead Reservation Fuels Management Plan 1982-1986.

3. Logging Roads
   Although most forest roads on the Reservation were constructed as a part of logging operations, they now serve many purposes including access for hunting, fishing, and fire control. Logging roads are designed keep construction and maintenance costs low while providing adequate protection for the environment. Logging road standards are shown in Table IV-1, page 145.

4. Access Roads and Transportation Plan
   The BIA Roads System contains 390 miles of mostly high or intermediate standard logging roads. These roads connect main haul roads to county roads or state highways. The Branch of Forestry is currently compiling a Transportation Plan to display the status of forest access and assist in planning future forest access. The Orthophotograph Project and Road Sign Project are two ongoing projects that will assist forest users and planners.

5. Rights-of-way
   Rights-of-way easements will be acquired early in developing a timber sale or other project to facilitate orderly development and preparation of the project.

6. Land Acquisition
   The Tribal land acquisition program promotes efficient land management through consolidation of tribal ownerships. The land acquisition program should continue.

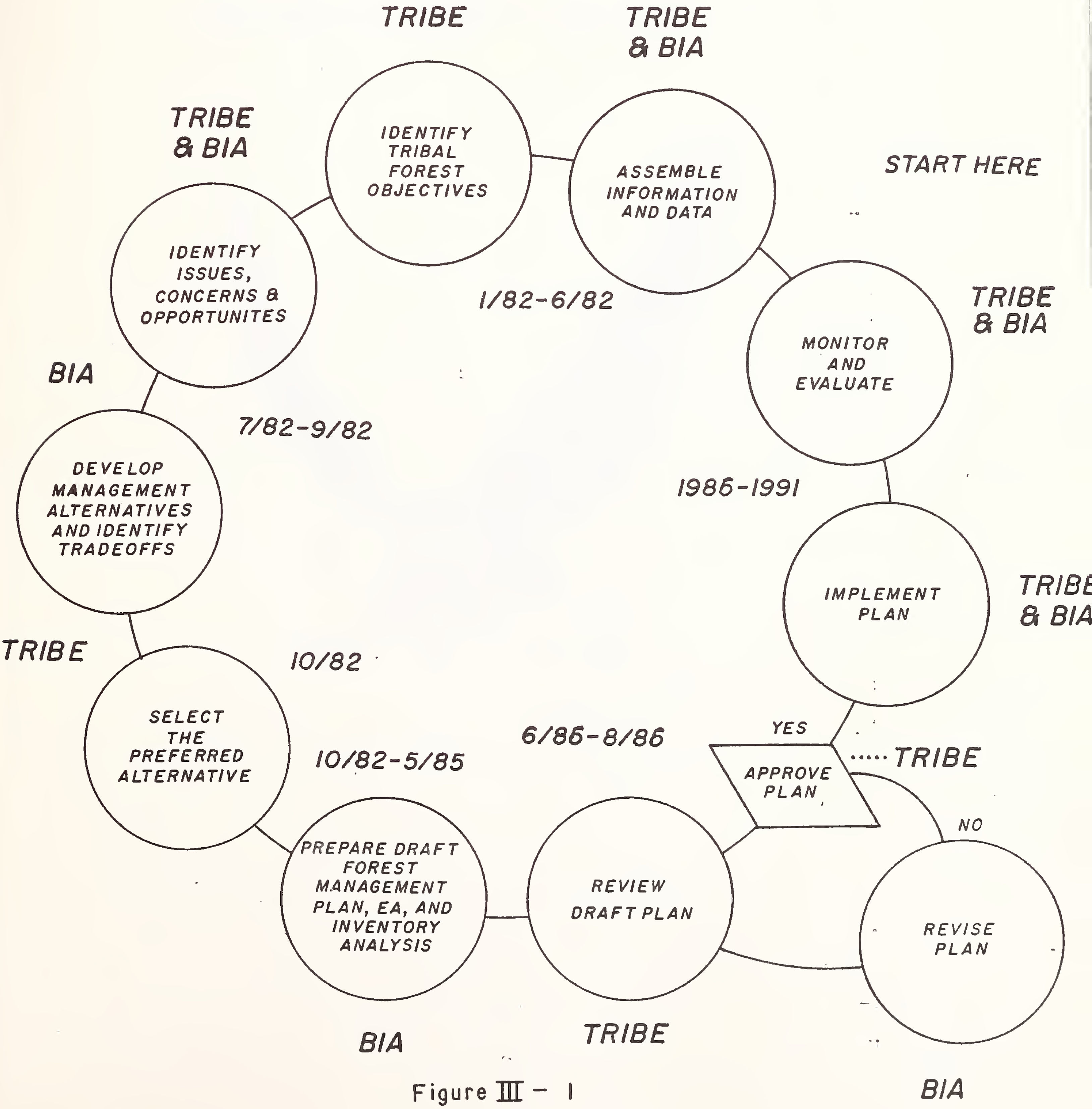
7. Permit Program
   Forest products harvested other than under formal timber sale contracts will be administered through the Permit Program. Annual statements of policy and procedure are required by Bureau of Indian Affairs Manual (BIAM) and are the main vehicles by which the permit program is updated to meet the needs of the Indian landowners. The Christmas tree program will continue to develop during this management period as alternatives to provide for both Christmas trees and sawlog production are studied.

8. Sales Policy
   This portion of the Action Plan describes how timber sales are planned, scheduled and prepared. The Five Year Timber Sale Plan outlines when and where the harvest of timber is to take place for the next five years. A copy of the Five Year Plan is in Appendix E. The Tribes have established an Indian preference sales policy for timber sales less than 5 MMBF. The timber sale planning procedure is an interdisciplinary effort designed to accomplish mulitple use management for the Reservation.

9. Lodgepole Pine Management

The objective for management of the lodgepole pine timber type is to establish a land base for sustained-yield post and pole production. A special Lodgepole Pine Management Plan has been prepared and is contained in the Action Plan. The summary for the plan is on page 175.

FLATHEAD INDIAN RESERVATION
FOREST MANAGEMENT PLANNING PROCESS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TRIBE & BIA
ASSEMBLE INFORMATION AND DATA
TRIBE
IDENTIFY TRIBAL FOREST OBJECTIVES
1/82-6/82
TRIBE & BIA
IDENTIFY ISSUES, CONCERNS & OPPORTUNITES
7/82-9/82
BIA
DEVELOP MANAGEMENT ALTERNATIVES AND IDENTIFY TRADEOFFS
10/82
TRIBE
SELECT THE PREFERRED ALTERNATIVE
10/82-5/85
BIA
PREPARE DRAFT FOREST MANAGEMENT PLAN, EA, AND INVENTORY ANALYSIS
6/85-8/86
TRIBE
REVIEW DRAFT PLAN
TRIBE
APPROVE PLAN
YES
NO
BIA
REVISE PLAN
TRIBE & BIA
IMPLEMENT PLAN
1986-1991
TRIBE & BIA
MONITOR AND EVALUATE

Figure III - 1

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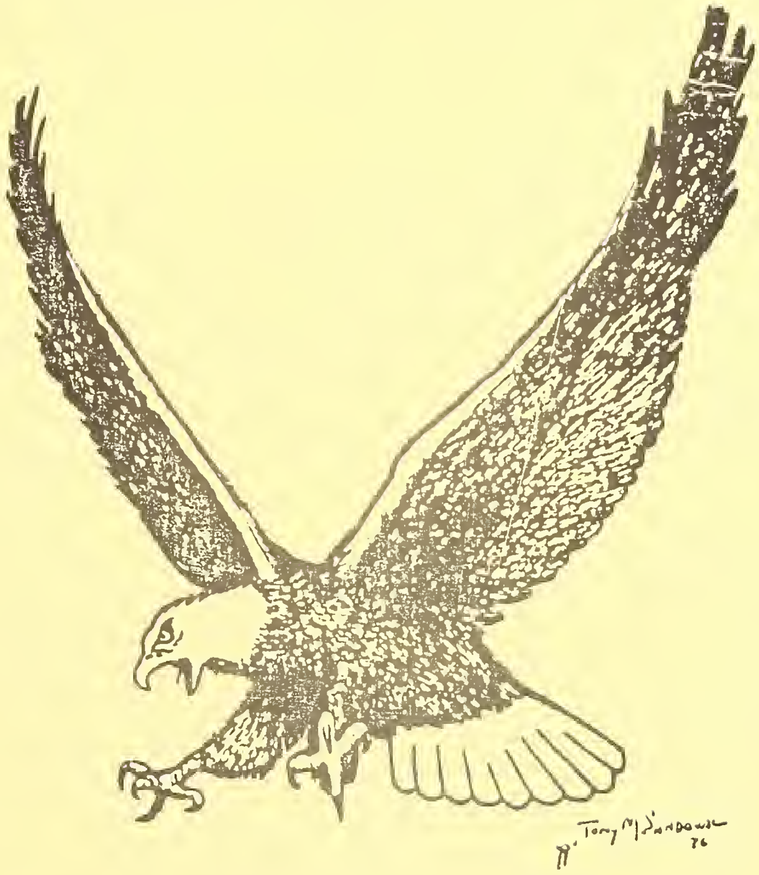
PORTLAND AREA ADDENDUM 3.2 C (4)(a)

Chapter III

MANAGEMENT PLAN



III. MANAGEMENT PLAN

A. Purpose and Need

How should the Flathead Indian Reservation forest be managed? This is the central question to be addressed by this plan. The purpose of the Forest Management Plan is to provide long-term direction for managing the Reservation forest. This plan covers the period 1982-1991 and contains many changes from the previous plan which was approved by the BIA and Tribes in 1975. The new plan is needed due to changes in the forest's condition, new information about forest management and insect and disease problems, and changes in BIA and tribal goals and objectives.

B. Management Planning Process

The forest management planning process is shown in Figure III-1. On January 25, 1982 the BIA Branch of Forestry met with the Tribal Council to discuss goals, objectives, and basic forest policy for the 1982-1991 Forest Management Plan.

During the summer of 1982 a scoping committee met to identify forest management issues and concerns. Participants in the scoping process included the BIA Branches of Forestry, Wildlife, Land Services, Tribal Council, Tribal Forest Management Enterprise, and the Tribal Natural Resources Department. Alternatives were developed for each management concern such as precommerical thinning, use of herbicides, even-age cutting block size, and slash disposal. The Tribal Council reviewed the alternatives and selected a preferred alternative.

In October of 1982 the Council also reviewed and approved the management objectives and goals for the Plan. During the fall of 1982 the Branch of Forestry, with assistance from other branches and agencies, prepared the draft Forest Management Plan in light of the preferred alternatives and objectives selected by the Tribes. Since 1982 many revisions to the draft Plan have been made to reflect the increased emphasis on multiple use management and other changes in management direction brought about by the change in council membership that occurred in January of 1984. The draft plan has also been revised to include changes recommended by the scientists at the University of Montana who prepared the environmental assessment (EA) for the Plan.

On February 28, 1986 the Tribal Council reviewed four alternative levels of harvest ranging from an estimated 65,000,000 board feet to 14,000,000 board feet annually. The Council selected alternative C, the 39,000,000 board feet per year, Non-Timber Emphasis Alternative. This alternative includes the provisions for muliple use management that interdisciplinary teams have developed during the last two years. This alternative provides for salvage cutting only in the temporary even-aged component, approximately 74,000 acres. The Council felt that the visual impacts of harvesting these stands was unacceptable even though these stands are heavily diseased and need harvesting and regeneration. Selective logging is not a viable alternative for these stands since the disease would increase with partial cutting.

Additional changes to the draft plan will be made after the Plan and EA have been reviewed by the public. Opportunities for public comment will be announced in local papers and public meetings will be held in several communities on the Reservation to get input and answer questions concerning the Plan.

Forest management planning is a never ending process as illustrated by the large circle in Figure III-1. Forest management is continually being evaluated and as new information develops the Plan will be revised to include needed changes.

C. Management Objectives and Goals

The Flathead Indian Reservation Forest will be managed to achieve the objectives and goals established by the BIA and the Tribes. In developing the Forest Management Plan the BIA and Tribes are guided by federal regulations. The first seven objectives reflect the BIA's policy of sustained yield management as stated in the Code of Federal Regulations, Title 25, Part 163.

1. The development, maintenance, and enhancement of commercial forest lands in a perpetually productive state by providing effective management and protection, by applying sound silvicultural and economic principles to the reforestation, growth and harvesting of timber and other forest products.

2. The regulation of the commercial forest resources through the establishment of a timber sales program that is supported by written Tribal objectives and a long-range multiple use plan.

3. The increased participation of Tribal members in harvesting, management and marketing of their forest resources to promote self-sustaining communities, so that the Tribes may receive from their own property not only the stumpage value, but also the benefit of whatever employment and profit it is capable of yielding.

4. The sale of timber in open competitive markets to receive optimum fair market value in accordance with the wishes of the Tribes.

FLATHEAD INDIAN RESERVATION
FOREST MANAGEMENT PLANNING PROCESS

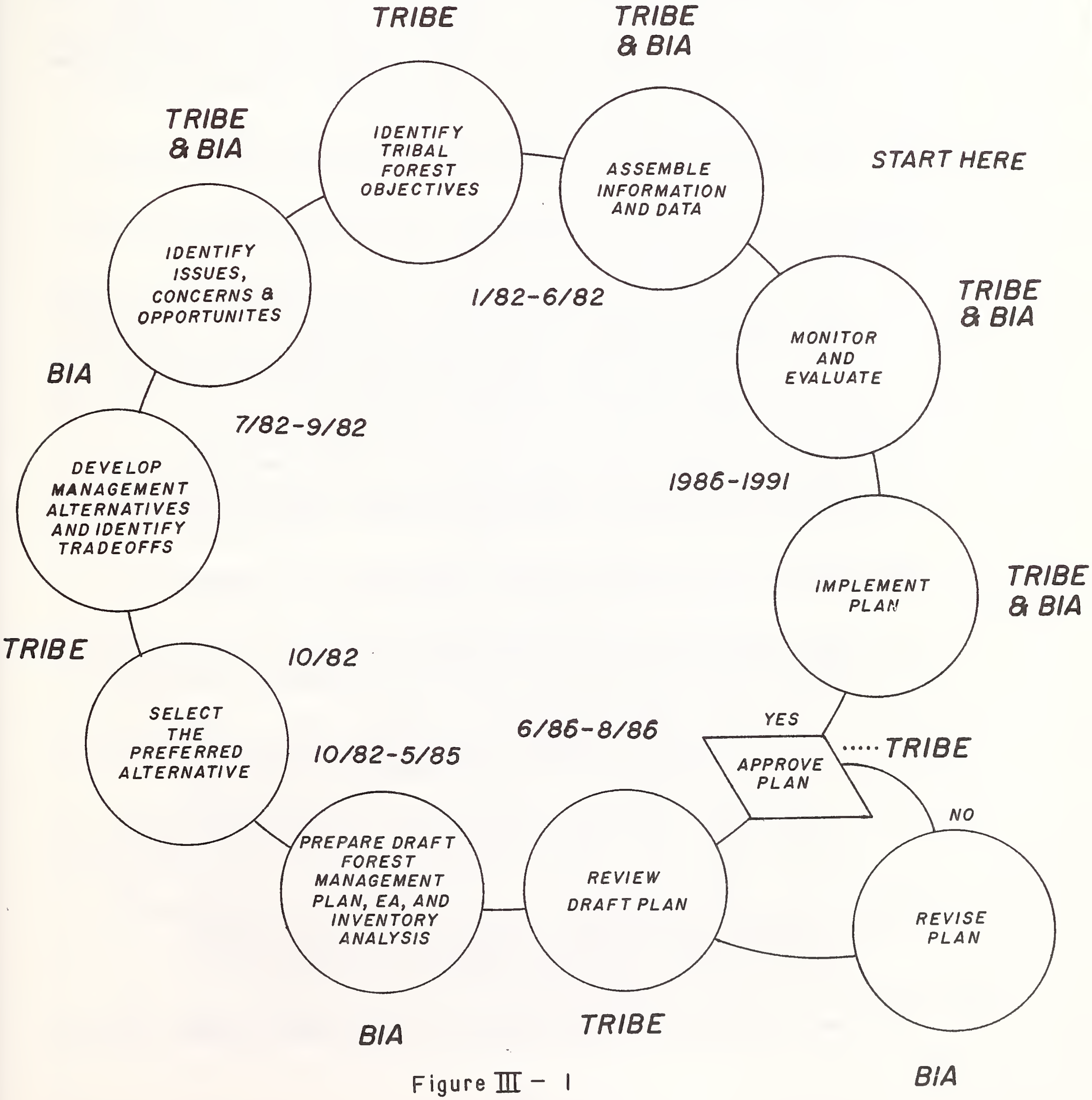

TRIBE
TRIBE & BIA
TRIBE & BIA
IDENTIFY TRIBAL FOREST OBJECTIVES
ASSEMBLE INFORMATION AND DATA
START HERE
IDENTIFY ISSUES, CONCERNS & OPPORTUNITES
1/82-6/82
MONITOR AND EVALUATE
TRIBE & BIA
BIA
7/82-9/82
DEVELOP MANAGEMENT ALTERNATIVES AND IDENTIFY TRADEOFFS
1986-1991
IMPLEMENT PLAN
TRIBE & BIA
TRIBE
10/82
SELECT THE PREFERRED ALTERNATIVE
YES
6/86-8/86
APPROVE PLAN
TRIBE
10/82-5/85
NO
PREPARE DRAFT FOREST MANAGEMENT PLAN, EA, AND INVENTORY ANALYSIS
REVIEW DRAFT PLAN
REVISE PLAN
BIA
TRIBE
BIA

Figure III - I

ROM: 53 BIAM SUPP. 2
PORTLAND AREA ADDENDUM 3.2 C (4)(a)

5. The preservation of the forest in its natural state whenever the Tribal Council determines that the recreational, cultural, aesthetic, traditional, or other values of the forest represent the highest and best use of the land to the Tribes.

6. The management and protection of forest resources to retain the beneficial effects of regulating water runoff and minimizing soil erosion.

7. The management and protection of forest lands to maintain and/or improve timber production, soil productivity, water quality, grazing, wildlife, fisheries, recreation, aesthetic, cultural, and other traditional values of the forest to the extent that such action reflects Tribal policy, goals, and objectives.

8. The preservation of identified cultural, archeological and historical sites.

Specific goals for this ten-year management plan period are as follows:

1. Conduct harvest operations in a manner which; (a) leaves the forest in the best possible condition for placing it on a sustained yield basis, (b) provides for succeeding cuts for a continuing and profitable forest business, (c) is compatible with State-of-the-Art silviculture, and d) maintains long-term site productivity.

2. Pursue the harvest in stands at a rate compatible with the calculated allowable annual cut and multiple use concerns utilizing even-aged, uneven-aged, and temporary even-aged management systems.

3. Pursue the salvage of both mortality and imminent mortality where feasible.

4. Take appropriate presuppression and prompt and effective management action when required to protect the forest from insects and disease.

5. Continue habitat typing of the Reservation forest and to provide a permanent base for land-unit planning.

6. Promote the completion of reservation soil survey on forest lands and the develop land productivity classes by correlating soil types and habitat classification.

7. Progessively increase annual growth, and consequently allowable cut through increased commercial and precommercial thinning, mistletoe control and rehabilitation when economically feasible.

8. Keep precommercial thinning and mistletoe control current

with all harvesting operations and eliminate any backlog.

9. Insure prompt regeneration on harvested units on intensively managed lands.

10. Develop and implement a tree-improvement plan for the production of genetically improved stock.

11. Maintain the permit and small timber sales program to provide opportunities for bonafide Indian loggers, conduct sanitation/salvage operations, and to harvest isolated timber tracts.

12. Make intermediate cuttings from allotments with the following guidelines:

    a. Priority given to requests made by Indian people so they may receive benefits from their timber ownerships.

    b. Wherever possible grouping several allotments with Tribal land into one unit to encourage competitive stumpage prices and to reduce administrative expense.

    c. To manage for the highest and best use and maintain the land in a productive state.

13. Identify and secure permanent access to all major timbered areas within the commercial forest on the Reservation.

14. Implement a management plan for the lodgepole pine component.

15. Develop in cooperation with the Tribes a diversified Christmas tree management program.

16. Continue to encourage the utilization of presently unmerchantable material as firewood or other products.

17. Manage road access implementing the needs and desires of the Tribes, to protect wildlife and fisheries habitat, the water resource, forest investment areas, and to discourage arson, trespass and poaching while still allowing access by Tribal members to designated forested areas.

18. Continue to develop and implement a fire and fuels management program including prescription burning for wildlife habitat, hazard reduction, let-burn, smoke management, fuel manipulation, training, etc.

19. Initiate a cumulative impacts study which will assess the effects management activities have on different

resources, and develop methods to mitigate the adverse effects.

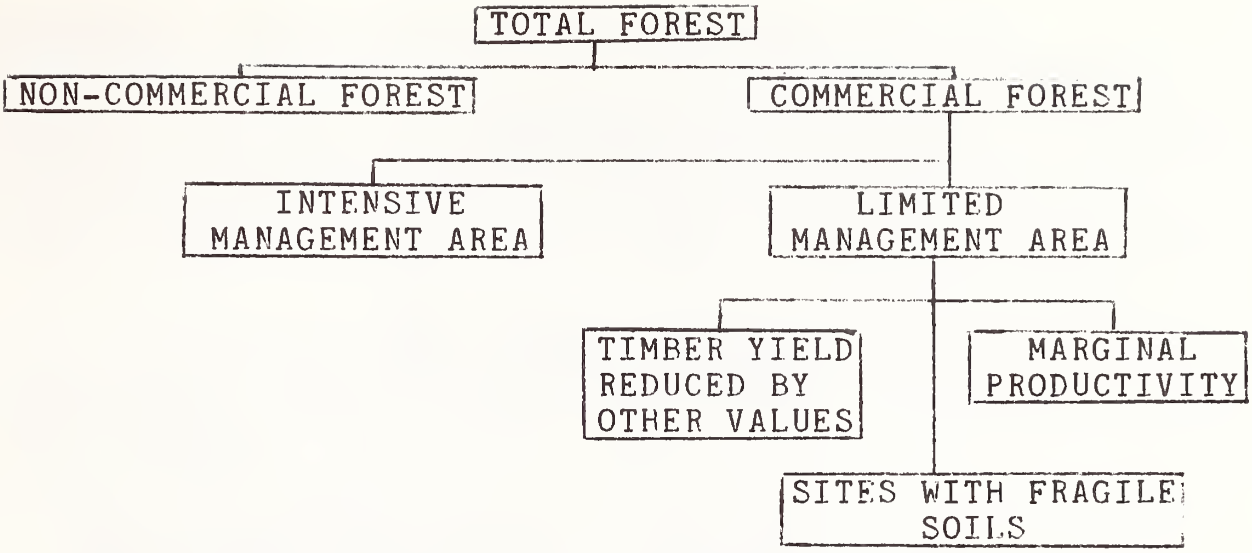
20. Develop and implement a multiple use forest management plan in accordance with Tribal Council direction and as stated in the C.F.R.

21. Develop a formal procedure by which timber sale plans are developed by an interdisciplinary team.

22. Identify, set-aside, and develop a management program for several old growth stands within the commercial forest.

McDonald Reservoir

D. Forest Management Policy
The basic framework for classifying forest land for timber planning purposes on the Flathead Reservation is illustrated below.



The total forest area has been divided into two broad classes which in turn have been subdivided. The following discussion defines the resulting land classes and management policy.

1. Non-Commercial Forest
   This class includes:

   a. Areas withdrawn from timber use such as designated wilderness and primitive areas. Management policy will focus on forest protection.

   b. Areas that are so steep, unstable or rocky that they cannot be used for timber production without causing serious impacts. Protection of current values will be the only management.

   c. Productive areas where there is low probability, during the next 10 years, of the timber being utilized because of excessive development costs. Protection of current values will be the only management.

   d. Non-productive areas that lack the capacity to grow at least 15 cubic feet of timber per acre per year.

2. Commercial Forest
   The commercial forest consists of all productive areas that are accessible and suitable for timber use that have not been temporarily or permanently withdrawn from such use. Subdivision of this base is determined by whether the area will be managed intensively for timber production or not.

   a. Intensive Management Area
   This class includes commercial forest lands capable of growing at least 20 cubic feet of timber per acre per year. Forest management practices implemented to preserve or enhance values other than timber do not

significantly reduce timber yield in this area.

b. Limited Management Area
The limited management area consists of commercial forest sites having marginal productivity or fragile soils, or where timber yield is significantly reduced by other values.

(1). Marginal Productivity
This class includes lands which have the capacity to grow at least 15 cubic feet but not more than 20 cubic feet of timber per acre per year, and/or would be extremely difficult to reforest because of severe site conditions. Management policy will permit sanitation/ salvage cuttings provided this action will not adversely impact the dominant use (generally forage production, wildlife habitat, or watershed) of the land. Intensive forest management will not be practiced and investments in thinning, reforestation will not be made (except for fire rehabilitation) on these lands.

(2). Timber Yield Reduced by Other Values
Included are lands presently suitable and available for timber production on which protecting values such as water, big game, and others will result in reduced timber yields. Management policy will be to protect water quality through the designation of streamside management zones. Timber harvest will generally be restricted to sanitation/salvage cuttings.

(3). Sites with Fragile Soils
This currently describes lands which may be forested and which support or potentially support stands having commercial values. These lands contain soils whose productive capacity to grow trees would be seriously impaired and subsequently diminished for the long term. Soils whose productivity may be lowered by forest management activities have been identified (University of Montana, 1984). Appropriate mitigation measures are described in Section III.H. of this Plan (page 60).

3. Management Systems
The purpose of this section is to introduce and define the management systems that will be used on the commercial forest. Further details of the management and silvicultural systems are presented in section III. F.

It is important to understand the relationship between management and silviculture. Management is the administrative and regulative process to implement the policies and attain the objectives established for a forest property. Silviculture is the process of tending, harvesting, and replacing timber stands resulting in a forest of a destinctive form (Gibbs, 1978). In uneven-aged management there is one silvicultural harvest system - selection. In even-aged management there are three silvicultural harvest systems - shelterwood, seed tree and clearcutting. Once a silvicultural treatment is implemented, it is usually irreversible, hence long-term management planning is essential to successful silviculture.

a. Uneven-aged Management

Uneven-aged management is the manipulation of a forest to provide; 1) recurring regeneration of desirable species, 2) the orderly growth and development of trees in at least three distinct age classes, and 3) a sustained yield of forest products. For the Reservation forest an age class is defined as all trees within 20 years of the same age. Trees are harvested singly or in small groups.

(1). Intensive Management Area

Uneven-aged management in the intensive management area will be on a 20 year cutting cycle. Each harvest will include thinning and other cultural treatments designed to promote growth and regeneration and improve the quality of the remaining trees.

(2). Limited Management Area

No specified cutting cycle will be applied to stands in the limited management area. Entries will be limited to sanitation/salvage type cutting or cutting designed primarily to enhance resources other than timber such as wildlife, range, or watershed.

b. Even-aged Management

Even-aged management is the manipulation of forests to provide, 1) periodic regeneration of desirable species, 2) the orderly growth and development of trees to a given size or age in each stand, and 3) development of harvestable stands to provide a sustained yield of forest products. As the name implies, trees in an even-aged stand are all about the same age. Managed even-aged forests are composed of timber stands of various ages. Regeneration occurs only once during the life of the stand at or near the time of complete harvest when the stand reaches the desired age (rotation age).

(1). Intensive Management Area

Even-aged management in the intensive management area will include treating stands between harvests with thinnings and other cultural treatments designed to promote growth and improve tree quality. Both natural and artificial (planting and seeding) regeneration methods will be used.

(2) Limited Management Area

Even-aged management in the limited management area will limit cutting to that which will primarily enhance resources other than timber. Only natural regeneration methods will be used. Old growth even-aged stands in limited management areas such as streamside zones will likely develop into irregular uneven-aged stands where harvest is limited to sanitation/salvage cutting. When timber harvest is permitted in limited management areas selection cutting will generally be used.

4. Habitat Type Groups

It will be the policy of the Branch of Forestry to use habitat types, (Pfister, 1977), as a major tool in developing silvicultural and management prescriptions for the Flathead Reservation. All land areas potentially capable of producing similar plant communities at climax may be classified as the same habitat type, and therefore represent a relatively narrow set of environmental circumstances and delineate a certain potential for growth. The main advantage of using habitat types in forest management is that they provide a permanent and ecologically based system of land stratification. This is an improvement over using only "cover type" stratifications. Cover types are based on what species occupy a site at a given time, and are subject to change whenever management practices alter the species composition. The adoption of habitat types will allow foresters to make better prescriptions for manipulating vegegation based on knowledge of the ecological potential of the land.

The following table reports the occurence of habitat types encountered on the Continuous Forestry Inventory (CFI) plots on the Reservation. Since the CFI plots systematically sample the forest land base, the frequency distribution of habitat types encountered should approximate the actual distribution of habitat types on the reservation.

Table III-1. Distribution of Habitat Types on the Commercial Forest

Habitat Type/Phase	Common Names	Relative Occurence on CFI Subplots (Percent)
Psme/Phma - Phma	Douglas-fir/ninebark - ninebark	11
Psme/Phma - Caru	Douglas-fir/ninebark - pinegrass	9
Psme/Caru - Agsp	Douglas-fir/pinegrass - bluebunch wheatgrass	8
Psme/Vaca	Douglas-fir/dwarf huckleberry	7
Abgr/Clun - Clun	grand fir/queen cup beadlily - queencup beadlily	6
Abgr/Libo - Xete	grand fir/twin flower - bear grass	6
Psme/Caru - Aruv	Douglas-fir/pinegrass - kinnikinnick	5
Abla/Mefe	subalpine fir/menziesia	5
Psme/Syal - Agsp	Douglas-fir/snowberry - bluebunch wheatgrass	4
Psme/Syal - Syal	Douglas-fir/snowberry - snowberry	4
Psme/Fesc	Douglas-fir/rough fescue	3
Abgr/Clun - Xete	grand fir/queencup beadlily - bear grass	3
Abgr/Libo - Libo	grand fir/twinflower - twinflower	3
Pipo/Syal - Syal	ponderosa pine/snowberry - snowberry	2
Psme/Libo - Syal	Douglas-fir/twinflower - snowberry	2
Psme/Libo - Vagl	Douglas-fir/twinflower - blue huckleberry	2
Psme/Syal - Caru	Douglas-fir/snowberry - pinegrass	2
Psme/Caru - Caru	Douglas-fir/pinegrass - pinegrass	2
Abla/Clun - Mefe	Subalpine fir/ queencup beadlily - menziesia	2
Abla/Libo - Xete	Subalpine fir/twinflower - bear grass	2
Psme/Caru - Pipo	Douglas-fir/pinegrass - ponderosa pine	1
Psme/Spbe	Douglas-fir/white spiraea	1
Abgr/Xete	grand fir/bear grass	1
Thpl/Clun - Clun	western red cedar/queencup beadlily - queencup beadlily	1
Thpl/Clun - Mefe	western red cedar/queencup beadlily - menziesia	1
Abla/Xete - Vasc	Subalpine fir/bear grass - grouse whortleberry	1
Abla/Alsi	Subalpine fir/Sitka alder	1
Abla/Luhi - Mefe	Subalpine fir/smooth wood-rush - menziesia	1
Pipo/Feid - Fesc	ponderosa pine/Idaho fescue - rough fescue	<1
Pipo/Putr - Agsp	ponderosa pine/bitterbrush - bluebunch wheatgrass	<1
Pipo/Putr - Feid	ponderosa pine/bitterbrush - Idaho fescue	<1
Psme/Agsp	Douglas-fir/bluebunch wheatgrass	<1
Psme/Vagl - Vagl	Douglas-fir/blue huckleberry - blue huckleberry	<1
Psme/Vagl - Xete	Douglas-fir/blue huckleberry - bear grass	<1
Picea/Clun- Clun	Engelmann spruce/queencup beadlily - queencup beadlily	<1
Abgr/Clun - Arnu	grand fir/queencup beadlily - wild sarsaparilla	<1
Abla/Clun - Clun	subalpine fir/queencup beadlily - queencup beadlily	<1
Abla/Clun - Arnu	Subalpine fir/queencup beadlily - wild sarsaparilla	<1
Abla/Clun - Vaca	Subalpine fir/queencup beadlily - dwarf huckleberry	<1
Abla/Clun - Xete	Subalpine fir/queencup beadlily - bear grass	<1
Abla/Vaca	Subalpine fir/dwarf huckleberry	<1

<1 = less than one percent

Habitat types, both those encountered on CFI plots and others known to occur or having the potential to occur on Reservation forests, have been partitioned into seven groups. The groupings are based on relative wood producing potential, environmental gradients, species composition potential, the role fire has played in their development, and dominant resource values.

The following discussions and lists depict the groups of habitat types developed for the Flathead Reservation:

a. Group A - Ponderosa Pine and Very Dry Douglas fir
Open grown ponderosa pine and/or Douglas-fir with bunchgrasses in the understory and scree sites. Site indices on a 50 year base average less than 45. Maximum potential basal areas range from 75-150. These are the warmest, driest sites supporting forest trees. Soils are generally shallow and rocky with low available water capacity. These lands are important big game winter ranges and produce good forage for livestock. Soils generally are in groups 4 and 5 as described in the Environmental Assessment prepared by the University of Montana (1984).

Annual precipitation is generally less than 15 inches except on scree sites. Habitat types falling into this grouping include:

Scree
Pipo/Agsp
Pipo/Feid - all phases
Pipo/Putr - all phases
Pipo/Syal - all phases
Psme/Agsp
Psme/Feid
Psme/Fesc

This extensively managed group represents an estimated 5% of the forested lands on the reservation.

b. Group B - Dry Douglas-fir
This grouping consists of Douglas-fir habitat types that are transitional between bunchgrass habitat types and those dominated by understory shrubs. Bunchgrasses are common and these sites are too dry to support either western larch or lodgepole pine. These lands are fair to good for forage production, and are important for big game winter range. Natural regeneration is generally difficult to obtain and has been reported to take in excess of 25 years to become established (Arno et al., 1985). Precipitation ranges from 14-17 inches annually. Sites are low to moderate for timber production averaging 20 cu.ft./acre/year. Site indices on a 50 year base average about 50. Soils have low organic matter content. Wildfire incidence is high and fire has played an important role in maintaining ponderosa pine on these lands. Habitat types included in this group include:

Psme/Syal - Agsp and Syal phases
Psme/Caru - Agsp and Pipo phases
Psme/Phma - Caru (dry phase)

This group occupies approximately 24% of the forest land on the reservation, and generally will be managed under uneven-aged silviculture.

c. Group C - Moist Douglas-fir
These are Douglas-fir habitat types that are characterized by shrub understories mixed with pine grass and/or beargrass. Moisture is sufficient to support western larch and lodgepole pine, but temperatures of some habitat types may approach the cold limits of ponderosa pine. Productivity for timber is moderate to moderately high, 20 cu.ft./acre/year or higher. Potential productivity under intensive management should reach 70 cu.ft./acre/year. Some habitat types provide big game winter range and elk calving areas. Dwarf mistletoe is a major problem. Vegetative recovery due to disturbance is relatively slow and natural regeneration maybe retarded by ground cover competition. Livestock grazing value is marginal. Habitat types included within this group are:

Psme/Vaca
Psme/Phma - phma
Psme/Syal - caru
Psme/Caru - aruv and caru* phases
Psme/Spbe
Psme/Vagl - vagl*, aruv and xete* phases
*type approaches the cold limits of ponderosa pine

Thirty-one percent of the forested lands are estimated to be in this group.

d. Group D - Grand Fir
Moisture and temperature approach optimum conditions for tree growth in this group. Climax species include grand fir, cedar and spruce. Timber productivity is high, averaging 45 cu. ft./acre/year, with a potential of about 115 cu. ft./acre/year under intensive management. Natural regeneration is easily established with minimal site preparation. Western larch, lodgepole pine, Douglas-fir and spruce are seral species on the grand fir and cedar habitat types. Ponderosa pine may be limited by cool temperature and frost pockets on some habitat types. This group is of minor value for big game winter range and livestock use. Species composition and understory vegetation are highly variable. Wildfire incidence is low, but catastrophic in nature. Habitat types occurring in this group include:

Psme/Libo - all phases
Picea/Clun - all phases
Abgr/Xete
Abgr/Libo - all phases
Abgr/Clun - all phases
Thpl/Clun - all phases

About 25% of the reservation forest fall into this group.

e. Group E - Warm Subalpine fir

These are the temperate forest habitat types, reflected by cool but moist conditions. Subalpine fir and mountain hemlock are the climax species, with Douglas-fir, western larch, lodgepole pine and Englemann spruce being the major seral species. Timber productivity is high, approximately 40 cu.ft./acre/year with a potential to produce 110 cu.ft./acre/year under intensive management. This group of habitat types receives moderate fall and summer use by big game.

Abla/Clun - all phases
Abla/Libo - Xete
Abla/Mefe
Abla/Alsi
Tsme/Mefe
Abla/Xete - Vagl
Abla/Vaca

About 13% of the forest lands occur in this group. Even-aged management will be utilized.

f. Group F - Cold Subalpine fir

These subalpine forest habitat types are too cold and/or dry to support Douglas-fir and western larch. Spruce and lodgepole pine are the major seral species. Productivity for timber is considered moderate averaging about 20 cu.ft./acre/year and having a potential of about 55 cu.ft./acre/year under intensive management. Whitebark pine is a common component of this group with subalpine fir the climax species. This group is characterized by very heavy natural fuels which present a catastrophic wildfire threat. Vegetative recovery to disturbance is slow. This group is important for elk summer range, and includes the following habitat types:

Abla/Xete - vasc
Abla/Luhi - mefe
Abla/Vasc - caru
Tsme/Xete
Abla/Libo - libo and vasc phases

About 2% of the commercial forest land base is included in this group. Even-aged management will be utilized.

g. Group G - Timberline

These are the timberline habitat types, characterized by cold temperatures and short growing season. This group is above the general upper limit of continuous forest and is highly variable in composition and density. Bare soil and rock are often exposed. Sites have low productivity for timber, 20 cu.ft./acre/year or less, and have very slow vegetive recovery after disturbance. Watershed values are very high. These areas are also important elk summer ranges, and some provide important grizzly bear habitat. Habitat types included within this group are:

Abla/Vasc - vasc
Abla(pial)/vasc
Abla/Luhi - vasc
Laly - Abla
Pial - Abla
Pial

Less than 1% of the commerical forest land base falls within this group. Extensive management employing sanitation/salvage cuttings are prescribed for this group.

Table III - 2. Distribution of Habitat Type Groups on the Commercial Forest

Habitat Type Group	Approximate Acres	Management System
A	16,000	Uneven-aged - mostly limited management
B	77,000	Uneven-aged [1/]
C	99,000	Uneven-aged [1/]
D	80,000	Uneven-aged [1/]
E	41,000	Even-aged
F	6,000	Even-aged
G	3,000	Uneven-aged, limited management
Total	322,000	

1/ Except acres containing diseased stands - These stands will temporarily be managed on an even-aged basis until they have been regenerated with healthy trees.

5. Cover Types

Cover typing is a useful method to describe the existing forest. Cover types are based on the tree species dominating a timber stand. The distribution of acres by species is shown in table III-3. These data result from a cover typing contract completed in 1983. Cover types were delineated on 1980, 1:24,000 color aerial photos by the contractor and field checked by the Branch of Forestry. Cover type information was then computer processed and summarized by Portland Area Office, Branch of Forestry to provide a report of forest acres by cover type.

Table III-3. Flathead Reservation Commercial Forest Acres

Species*	Accesible Commercial Acres	Other Forest Acres	Total Forest Acres
Ponderosa pine	86,464	11,732	98,196
Douglas-fir	126,880	19,151	146,031
Western Larch	43,274	4,608	47,882
Lodgepole Pine	49,166	27,635	76,801
Engelmann Spruce	16,976	9,884	26,860
Alpine fir	12,432	23,981	36,413
Grand fir	4,200	57	4,257
Whitebark pine	306	1,527	1,833
Western Red Cedar	950	31	981
SUBTOTAL	340,648	98,606	439,254
Non-stocked Commercial	5,620		5,620
Non-commercial		9,931	
TOTAL	346,268	108,537	454,805
Mission Mtn. Wilderness	-9,440	+9,440	
Jocko Primitive Area	-14,763	+14,763	
BASE TOTAL	322,065	132,740	454,805

* Primary species of cover type call

6. Stand Conditions

Whereas habitat types provide a valuable tool to land managers in prescribing a management treatment, and predicting the impact of that treatment on various resources, stand conditions may dictate or limit the management options available.

Stand conditions that will be considered in determining silvicultural and management prescriptions include:

(a) dwarf mistletoe infection level,
(b) presence of root rot infection centers and other diseases,
(c) presence of bark beetles, defoliators and other insects,
(d) stand age vigor or risk,
(e) overstocking or understocking,
(f) species composition,
(g) slope steepness,
(h) aspect,
(i) special soil conditions.

While habitat type groupings, stand conditions, and site factors will prescribe forest management and evaluate the potential of the land, the final force in shaping policy will be the wants, needs, and desires of the landowners.

E. Regulation

Three major commercial forest management components have been established for regulating the cut from the forest. They are the uneven-aged, even-aged (separated into mixed species and lodgepole pine), and temporary even-aged components. Data from the Flathead Continuous Forest Inventory (CFI) was analyzed to determine the net allowable annual cut (AAC) of 38,425 MBF. The discussion introduces the procedure used to arrive at the AAC figure for each management component. The detailed analysis is contained in the Flathead Reservation Forest Inventory Analysis for the 1982-1991 Management Plan Period (Tootell et al. 1985). A summary of the AAC by component is in Table III-4.

Table III-4. Allowable Annual Cut Summary for 1982-1991.

Management Component	Acres [1]	Gross AAC (MBF)	Reduced [2] AAC (MBF)	Reduced Net [3] AAC (MBF)
Uneven-aged	192,407	39,105	36,069	32,354
Even-aged, mixed species	35,255	5,319	4,599	3,831
Even-aged, lodgepole pine	20,429	2,994	2,520	2,240
Temporary Even-aged	73,974	14,351	0	0
TOTAL	322,065	61,769	43,188	38,425

[1] Total commercial forest acres.

[2] Reduced AAC results from management limitations on harvesting. This "limited management" reduces the timber harvest to protect other resource values.

[3] Net AAC results from reducing Gross AAC by a defect percentage, and a volume not cut due to management restrictions. All volumes are Scribner scale.

The instability of the timber market and reduction in the BIA staff cast substantial doubt on whether or not this AAC can be harvested during this management period. Considering the present staff and resource objectives of the Tribal Council, 25-30 MMBF is a more realistic annual harvest.

1. Uneven-aged Component
   a. General
   This is the largest component covering 192,407 acres. Healthy stands of ponderosa pine, Douglas-fir, grand fir and cedar habitat types comprise this component. Stands in these types with serious insect and disease problems are part of the temporary even-aged component. Uneven-aged stands are the management goal, therefore the Austrian formula is an appropriate method to calculate the AAC (Davis, 1966).

   b. The Austrian Formula
   The Austrian Formula is a widely used procedure for computing allowable cuts for uneven-aged forests. The allowable cut is computed as follows:

$$\text{Gross AAC} = I + \frac{V_{meas} - V_{pred}}{n} \times \text{Commercial Acres}$$

Where:

AAC = Gross Allowable Annual Cut

I = Average Annual Increment during the adjustment period (period of developing the desirable level of growing stock)

V_{meas} = Volume at the end of the measurement period (measured volume)

V_{pred} = The desired growing stock level (GSL) expressed as BF/AC. This is the average volume that regulated stands will be managed at.

n = The adjustment period in years necessary to develop the "target" level of growing stock.

The formula has two basic parts; the increment, "I" and the reduction of growing stock, "$\frac{Vmeas - Vpred}{n}$".

In the formula, "I" is net growth which, if not cut, would increase the average volume of growing stock. However, if the AAC exceeds "I" the growing stock will be reduced. The magnitude of "I", is the net average annual increment during the adjustment period. Net increment is accretion plus ingrowth minus mortality computed using gross volume tables (defect not deducted at this point). It is important to make realistic predictions of future growth since this value is averaged in with projected increment.

The remainder of the formula ($\frac{Vmeas - Vpred}{n}$) is an adjustment of standing volume necessary to obtain a desired growing stock level.

In a fully regulated forest, AAC equals net increment. However, since most of the Flathead Reservation forest exceeds the desired growing stock level, AAC equals net increment plus a reduction of the standing volume to the desired stocking level ($\frac{Vmeas - Vpred}{n}$).

During this 10 year management period, the policy is to retain some old growth as growing stock to develop the desired age class distribution. Thus, although the desired level of growing stock may be achieved, the forest is not fully regulated in the classic sense. Such a forest can be termed "semi-regulated" or "near-regulated". Full regulation is having the desired progression of sizes and ages classes in young trees.

The adjustment period, "n", is the time period in years to bring the forest to a regulated or "near-regulated" situation. This adjustment period is 60 years beginning in 1982.

c. Uneven-aged Allowable Annual Cut (ACC)

The AAC calculations for 1982-1991 on a per acre basis are as follows:

$$AAC = I + \frac{Vmeas - Vpred}{n}$$

Where: $I = 214.87$ bf/ac/yr

$Vmeas = 6108$ bf/ac

$Vpred = 6806$ bf/ac

$n = 60$ years

So:

$$AAC = 214.87 + \frac{6108 - 6806}{60}$$

$$= 203.24 \text{ bf/ac/year cut}$$

The gross AAC for all commercial uneven-aged acres equals 203.24 bf/ac/year X 192,407 acres = 39,105 MBF/yr. A more thorough discussion of the Austrian formula is in Appendix B of the Inventory Analysis (Tootell et al, 1985). To calculate net volume, deductions must be made for defect and breakage. Other deductions, made because of management limitations in some areas, result in a reduced net AAC. The defect and limited management area figures are developed and substantiated in the Inventory Analysis.

Gross AAC - (limited management deductions) X 1-defect (expressed as a decimal) = Reduced Net AAC.

Where:

Gross AAC = 39,105 MBF/year

limited management reductions = 3,036 MBF/year

defect = 10.3%

So: Reduced Net AAC =

(39,105 - 3,036) X (1 - .103) = 32,354 MBF/year

2. Even-aged Component

a. General

This component has 55,684 commercial forest acres in subalpine-fir and mountain hemlock habitat types. The species managed for in these types require even-aged silvicultural treatments. The area-volume check method for calculating AAC is appropriate for these even-aged types (Davis, 1966). The basic formula is:

$$\text{AAC} = \frac{\text{Acres x (standing volume/acre + growth volume/acre)}}{\text{Rotation age (or conversion period)}}$$

b. Mixed Species

The even-aged mixed species component has 35,255 acres. These include even-aged stands having less than 50 percent lodgepole pine.

The reduced net AAC for even-aged mixed species is 3,831 MBF/year. The following is an overview of this AAC calculation.

$$\text{AAC} = \frac{\text{Area x (standing volume/acre + growth volume/acre)}}{\text{Rotation age}}$$

Where:

Area = 35,255 acres
Standing volume/acre = 8,613 bf/ac
Growth volume/acre = 6,474 bf/ac
Rotation age = 100 years

So:

$$\text{AAC} = \frac{35{,}255\ (8{,}613 + 6{,}474)}{100}$$

= 5,319 MBF/year

Gross AAC is further reduced to net AAC by deducting a defect percentage. The reductions for limited management and defect are computed as follows:

Reduced Net AAC = (Gross AAC - limited management reductions) x 1 - defect (expressed as a decimal)

Where:

Gross AAC = 5,319 MBF/year
limited management reductions = 720 MBF/year
defect = 16.7%

So:

(5,319 - 720) x (1 - .167) = 3,831 MBF/year net.

c. Lodgepole Pine

Sawtimber There are 20,429 acres of stands having at least 50 percent lodgepole pine. The net reduced AAC is 2,240 MBG/year. The following overview explains the breakdown of that figure.

$$\text{Gross AAC} = \frac{\text{Area x (standing volume/acre + growth volume/acre)}}{\text{Conversion Period}}$$

Where:
Area = 20,429 acres
Standing/volume/acre = 4,166 bf/ac
Growth volume/acre = 1,696 bf/ac
Conversion Period = 40 years

So:

$$\text{Gross AAC} = \frac{20,429 \text{ x } (4,166 + 1,696)}{40}$$

= 2,994 MBF/year gross

This represents an accelerated cut so the lodgepole pine base can be converted to managed post and pole stands. The type of reductions which result in a reduced net AAC are the same for lodgepole pine as for mixed species even-aged. The reductions are:

Limited management = 474 MBF/year
defect = 11.1%

so the Net AAC = (2,994 - 474) x (1 - .111)
= 2,240 MBF/year

Post and Poles The Lodgepole Pine Inventory (LPI) has surveyed the lodgepole pine resource on the Reservation. There are 33,343 surveyed acres of stands where lodgepole pine is the primary or secondary cover typing call (BIA, 1972).

The lodgepole pine management objective is to manage the flatter, more accessible 15,000 acres for post and pole production. This will require orderly harvesting of the present lodgepole pine acreage reforesting the 15,000 acres to lodgepole pine. There are approximately 16.26 million posts available for harvest on the 33,343 acres. It would require 40 years, harvesting 400 thousand posts annually to complete this conversion. Projections from thrifty younger stands suggests 450 thousand posts per year could be grown on the 15,000 acres of post and pole ground. Therefore, for 40 years beginning in 1982, the AAC for post and poles will be 400 thousand pieces and 450 thousand pieces thereafter.

3. Temporary Even-aged Component

a. General

Though this component is found in the uneven-aged habitat types, it has been separated from uneven-aged management because of severe dwarf mistletoe infections and defective grand fir stands. Even-aged treatments are the only effective way to deal with these problems. Therefore, for this management period these areas are in a "temporary even-aged" category and will be placed back into the uneven-aged strata after these stands have been harvested. The specific criteria used to delineate plots into this component are as follows:

1. One-third or more of the plot trees are infected with dwarf mistletoe.

2. Sixty percent of the plot trees are grand fir.

3. Bark beetle have infected 1/3 or more of the trees in the plot.

4. Two thirds or more of the plot trees have any of the above problems.

b. Temporary Even-aged Allowable Annual Cut (AAC). In February 1986 the Tribal Council selected the Non-Timber Emphasis Alternative level of harvest. This alternative provided for salvage cutting only in the temporary even-aged component. It was decided that the visual and aesthetic resource had priority over timber management in these stands. If timber management was pursued for these stands using a 60-year conversion period, they would contribute approximately 14,000 MBF to the gross allowable annual cut. This component has 73,974 acres.

F. Timber - Silvicultural and Management Systems for the Commerical Forest

1. Intensive Management Area

This classification of the commercial forest includes those lands capable of yielding at least 20 cubic feet of wood per acre per year, that have not been withdrawn from the timber base, and are presently dedicated to optimizing timber growth and yield. Uneven-aged, even-aged, and temporary even-aged silvicultural and management systems will be employed to harvest, regenerate, sanitize, control stocking and salvage mortality. Adverse impacts of intensive timber management on other resource values will be mitigated.

a. Uneven-aged Management

(1). Management Policy

As previously stated, Agency policy designates that uneven-aged silviculture and management systems be applied on an area basis to lands falling into habitat type groups A, B, C, and D. Individual stands or portions of stands within these habitat type groups will be excluded from this policy because of stand, site, or stocking conditions. (See III.F.1.c. Temporary Even-aged Management, page 51.)

The philosophy of uneven-aged management comes from France and Switzerland and was based on the concept that forest management is an art that relies heavily on ecological principles. Only recently in Europe and the United States, has uneven-aged management and silviculture been treated as a science and shown to be as amenable to systematic treatment as even-aged managment (Hann and Bare, 1979). The philosophy of uneven-aged management emphasizes protection and improvement of a stable forest environment. This is achieved through selective harvesting, which causes less disturbance to the site than even-aged management with correspondingly less impact upon soil stability and productivity, visual quality, hydrologic relationships, and flora and fauna.

Uneven-aged management, as it is practiced on the Flathead Reservation, involves the application of a harvest-regeneration (silviculture) method that will result in stands containing trees of three or more different age/size classes, where stocking and structure of those classes will be managed to eventually reach a target stand condition. Trees that are excess to the target condition constitute the trees to be harvested.

During the next 60 years, the remainder of the conversion period, the goal of developing a uniform distribution of age classes will receive priority in the silvicultural prescription.

Uneven-aged target or regulated stands, to be worked toward in the next two cutting cycles and to be achieved in 40 years, will have the following stand variables, or attributes, managed:

1. Management or "crop" tree designated.
2. Species Composition.
3. Cutting cycle or length of re-entry period.
4. Optimum tree age/size and number of age classes.
5. "q" value or age/diameter class distribution.
6. Basal Area growing stock level.

These six attributes will be discussed below.

(a). "Management" trees, or "leave" trees, and "crop" trees are terms that are used to describe the trees that will be managed from sapling size to their optimal maximum size at harvest. An extremely important concept of uneven-aged management is the focus on the development and growth of individual crop trees, trees that must meet minimum quality standards and possess tree characteristics required to produce the largest most valuable trees possible by harvest. Harvestable trees, in addition to those trees that reach the target size/age, will be smaller trees that are excess to management needs or do not meet minimum "crop" tree standards, such as percent live crown minimums, or have poor form or other defects.

(b). Species composition goals will be habitat type dependent, and generally will attempt to attain or maintain as much species diversity in a stand as possible. Species diversity with a goal of limiting the climax species to 50% of the crop trees in a stand will provide a hedge against various forest pests and changing market conditions. Intraspecific competition for moisture and nutrients would tend to be more keen than inter-specific competition, hence the greater the diversity the greater the growing stock level might be. Diversity in forest stands will generally be desirable from a wildlife habitat standpoint as well as providing ecosystem stability.

(c). Cutting cycle or length of reentry period is the number of years between harvest operations in a stand. For management planning, a 20 year average cycle has been prescribed for the Reservation, but this may vary by site, with slightly shorter cutting cycles on the most productive sites and longer ones on the least productive sites. Some of the major factors controlling the cutting cycle length are forestry staffing, stand and site disturbance, volume per acre limits, and economics.

(d). Maximum tree size is a limit for harvesting purposes. Trees that will have grown past the maximum tree size during a cutting cycle would be harvested at the end of that cutting cycle. If maximum tree size is set, then the productivity of the site and the stocking level will determine how many age classes (cutting cycle length in years x number of cutting cycles or age classes = maximum tree age/size) will be required to biologically achieve the maximum tree size. On the other hand, if the number of age classes desired is set, the optimum tree age/size becomes a biological reality, again dependent on site productivity and stocking levels. Optimal tree size is an important concept in that it seeks to determine the point in time (and size) of a tree that volume and value growth culminate to optimize economic return. For this planning period, the policy for unevenaged stands in regard to maximum tree size/age, will be to use the old growth (140 yr. +) component where it occurs to develop new age classes where economically feasible and biologically practical. Basically, this will involve determining the number of harvest entries that can be supported with old growth timber, and determining how many cutting cycles will be required to develop a regulated stand comprised of four, more or less balanced age/size classes. A general stand profile depicting the current age/size class distribution will be developed so that excesses and gaps can be determined, and compared to a desired age/size distribution. Marking rules will then be developed on a stand specific basis to achieve the first step toward gaining regulation. Selection silviculture will have the specific objectives of harvesting high risk, low vigor damaged and diseased trees, providing growing space for residual crop trees, and preparing the site for natural regeneration. In very few, if any, existing stands, will balanced age/size classes exist so that harvesting could be based on an optimum tree size. This concept cannot be employed until regulated stands are developed.

(e) The "q" value is an index of the age/size class distribution. "q" is a constant value calculated as the ratio of the number of trees in a given diameter (age) class divided by the number of trees in the next larger diameter (age) class. A "q" of 1.0 would have an equal number of trees in all diameter/age classes. The usefulness of the concept is that it provides a quantitative basis for determining a target regulated stand. Through a computer program called WINNOW (Hall, 1983) a test of the best combination of maximum tree size, "q", species composition, stand density and cutting cycle can be modeled to optimize growth and/or economic return. Diameter distribution in the strictest sense, will be regulated to achieve the purposes of the owners. The general policy will be to carry as many crop trees as possible determined by the initial precommercial thinning in the 20 year old age class, through time to the maximum tree age/size class for harvest. No trees will be precommercially thinned from the 40 year old or older age classes. A low "q" ratio such as 1.1 will permit some improvement cutting in lower diameter classes, and yet insure most of the harvest occurs in trees that reach maximum tree size/age. The lower the productivity of the site, the more necessary it will be to maintain a low "q" ratio. This will insure that the harvest takes place in merchantable sized trees.

From a practical application standpoint, the total number of crop trees per acre remaining before harvest and precommercial thinning will fall into a rather narrow range, generally between 130 and 160 trees per acre, when "q" ratios between age/size classes range between 1.0 and 1.1. Depending on the number of age classes this will result in from 25 to 40 crop trees per age/size class per acre.

(f). Basal Area Growing Stock level, is the density of crop trees maintained in each size/age class at the start of a cutting cycle expressed as total square feet of basal area per acre. This growing stock level will be site specific with the objectives being to optimize periodic volume and value growth of crop trees and to establish adequate natural regeneration to form a new age class. Based on data derived from the Wilcox Demonstration Forest, located within habitat type group B on the Reservation, and from stand simulation utilizing Stage's prognosis model (Wykoff et al., 1982), optimum basal area growing stock levels will range from 35-40 square feet of basal area per acre on the least productive sites to about 90 square feet per acre for stands in habitat type group D. As mentioned previously, the range of total crop trees per acre will vary from about 130 to 160 before harvest and timber stand improvement work is completed.

(2). Silvicultural Procedure

Timber stands included in the uneven-aged management component vary widely, due to past practices on the Reservation. A portion of the component still remains in a virgin condition, other portions have had up to three previous harvest entries, most contain some old-growth timber, some contain a single age class, others as many as three or four age classes. Because of variability between stands, individual silvicultural prescriptions will be developed for similar stand conditions identified and mapped during presale reconnaissance. Each prescription will have the objective of moving the stand one step (cutting cycle) closer to the target or regulated condition. This objective will be accomplished through the commercial harvest of those merchantable trees not designated as crop trees; through subsequent timber stand improvement cutting that will remove excess and undesirable nonmerchantable trees, and by providing site

Uneven-aged stand (stocking Plot #4) on the Wilcox Demonstration Forest, Sunny Slope Area.

preparation and growing space to insure that a new age class develops. The focal points of the silvicultural prescription will be the identification of crop trees versus excess trees, and procedure for insuring adequate natural regeneration.

The identification of crop trees will assume a need for 100-120 trees per acre, distributed between three or four age/size classes after logging and thinning. Existing age/size class gaps and excesses will be identified for the stand. The number of additional cutting cycles required to achieve regulation will be determined. The old growth component of the stand will be evaluated and a decision made as to the number of additional cutting cycles, if any, that can be supported with old growth trees. The final step in the process will be the actual designation of either the cut or leave trees. Marking rules will be developed for each mapped stand condition, with the cut trees generally being marked.

Individual Tree Selection marking will designate for harvest high risk, poor vigor, severely damaged and diseased trees, and those trees that are excess to stocking requirements based on other risk factors, vigor, and age.

High risk factors include insect and disease problems, lightning scars, exposed root systems, excessive lean, and other tree problems that would cause the tree to die or deteriorate in value before the next harvest entry, or would sustain or increase an insect or disease problem.

Poor vigor factors include intermediate or suppressed crown position, crown length less than 20 percent of total height, narrow crown, flat topped or spike topped crown, dead twigs and branches throughout the crown, and short needles or partial needle compliment.

Excess trees, those not needed to satisfy stocking in an age/size class or fill a void in another, will be designated for harvest based on other risk factors which include animal, fire, frost and other forms of damage, broken or multiple tops, and tree lean. The severity of these problems combined with the age and crown length and condition of the remaining trees will serve as a rating system for prioritizing their harvest (see Table III-5).

Table III-5. Cutting Priority for Individual Tree Selection

Cutting Priority	Tree Age	Tree Condition 1/
1	All ages	high risk
2	140+	other risk
3	140+	poor vigor
4	80-140	other risk
5	80-140	poor vigor
6	<80	other risk
7	<80	poor vigor
8	140+	fair vigor - excess
9	80-140	fair vigor - excess
10	<80	fair vigor - excess
11	140+	good vigor - excess
12	80-140	good vigor - excess
13	<80	good vigor - excess

1/ Further information regarding tree condition is contained in Keen, 1942; Salmon and Bongberg, 1942; Roe, 1948; Miller and Keen, 1960.

Group selection marking has the specific objective of providing space and site preparation for obtaining natural regeneration in certain situations where this objective cannot be achieved through individual tree selection. Some stands comprised only of old growth timber and stands of nearly even-aged second growth timber may be designated for group selection in order to insure the establishment and growth of a new age class and prevent the perpetuation of an even-aged condition. This system may also be employed to harvest a clump of diseased or insect infested trees. Groups will generally be less than an acre in size.

Given the owner's objectives of uneven-aged management, the proposed components of a target or regulated uneven-aged stand and a silvicultural prescriptive technique to apply uneven-aged management, two problems cannot be overlooked. The first is that regulation goals are not achieveable in most stands in the next entry, and further , most existing unregulated stand and tree conditions will dictate filling major gaps in age/size classes with excesses from a single age/size class. It must be remembered that basal area growing stock levels, age/size class distributions, "q" ratios, and maximum tree age/size are regulation goals to work towards and cannot be reached in just one cutting cycle. The second problem is that the target stands are computer models and subject to modeling biases. It therefore is necessary to replicate the growing stock level study, as exists at the Wilcox Demonstration Forest north of Polson, on all other habitat type groups on the Reservation, to verify stand and crop tree growth, and study natural regeneration establishment and development. These studies will validate or modify current target stand goals. Other research needs involve the use of fire for site preparation and nutrient cycling, and the development of productivity classes based on soils and vegetation.

b. Even-aged Management

(1) General

The philosophy and development of even-aged management was first emphasized in Europe by the Austrian Forest Ordinance of 1786 which recognized clearcutting with artificial regeneration as the system to be used. A 1787 ordinance in Prussia declared that even-aged forests would be grown, and the Darmstadt Ordinance of 1776 prohibited selection harvesting (Mustian, 1975)

Thus, the debate between even-aged and uneven-aged management proponents has gone on for some 200 years in Europe and many other countries. Today the emphasis still remains on even-aged systems, especially in the western United States. However that emphasis also looks at modifying and adapting present systems to more precisely fit individual species requirements, site and stand conditions, and social and economic objectives. The latter emphasis is especially true on the Flathead Reservation, where even-aged management is limited to those specific site and stand conditions that require a regeneration cut, followed by the establishment of an even-aged stand that will be managed through time (a rotation) to the point where that stand, in turn, will be harvested.

Even-aged management and silvicultural systems will be applied to stands on the Flathead Reservation occurring in habitat type groups E and F, the subalpine fir habitat types. About one-third of the 35,000 acres of spruce-fir stands that occur on these habitat types and ten percent of the 20 thousand acres of lodgepole pine stands are categorized as over-mature and have marginal potential for future growth. (See Lodgepole Plan, Sec. IV.J.) Blowdown is common after any kind of initial partial cutting in these stands and may be heavy if a stand is opened up. Old growth spruce is especially susceptible to spruce bark beetle which often builds up and spreads from blowdown. Western larch is generally the only windfirm species that occurs on these habitat types. Even-aged management will also be prescribed for steep sites on other habitat type groups where prescribed burning is the only means available to accomplish site preparation.

(2) Regeneration Treatments

There are two broad categories of silvicultural treatments. The first, regeneration treatments, are methods designed to harvest existing stands and replace them with new stands. The types of even-aged regeneration treatments are: clearcutting, seed tree, and shelterwood.

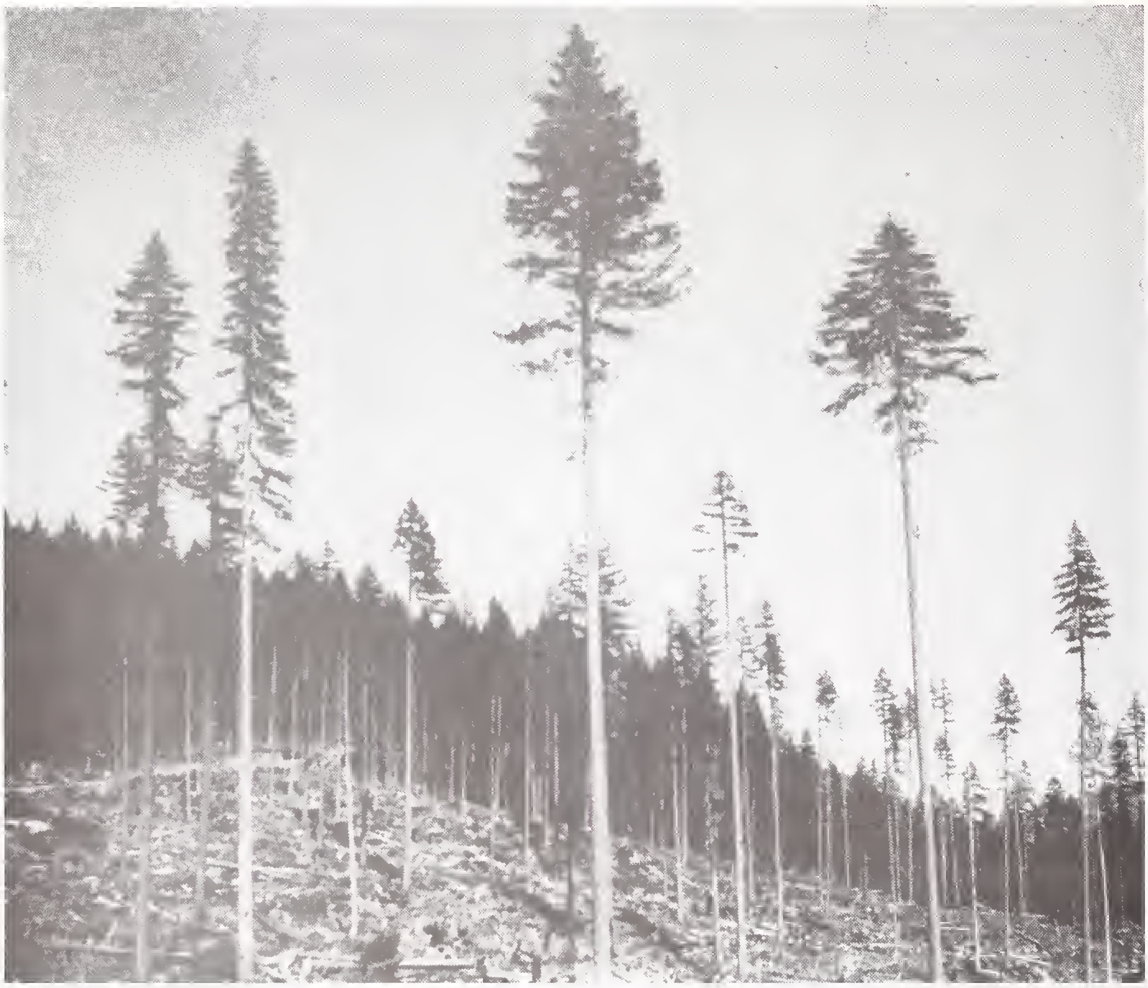
(a). Clearcutting

The regeneration method consists of cutting all trees in a designated area and leads to the establishment of an even-aged stand. This method will be employed when healthy, wind-firm seed trees are lacking. This method is used where site conditions are moderate and reserve trees are not needed to provide for visual quality. Clearcuts will be planted following site preparation on sites where natural regeneration has met with limited success.

Plantation 9 years after clearcutting.

(b). Seed Tree
This method consists of cutting the entire stand except for certain trees left to provide seed for natural regeneration. Generally fewer than five trees per acre are left, so they afford little shelter.

This method is used when good seed-producing trees of desireable species such as ponderosa pine or western larch are present in the stand.



Seed tree regeneration cutting on the Lozeau Logging Unit.

(c). Shelterwood

The shelterwood method involves two or more harvest cuts to regenerate the stand under the protection of the old stand. The shelterwood method is used on harsh sites where it is necessary to modify temperature extremes to establish seedlings. Generally 10 to 30 trees per acre are left following the "seed cut". These trees are removed in the "final cut" after regeneration is established and the protection of the overstory trees is no longer needed. The shelterwood is the preferred method to use where visual resource values are high such as areas seen from major highways and communities.

(3). Special Considerations for Regeneration Treatments

(a). Logging Methods
Logging with tractors will generally be restricted to cutting blocks where slopes do not exceed 45%. Cable systems will be required to harvest slopes exceeding 45%. Generally all cable logging areas will be managed on an even-aged basis as discussed in Section III.F.1.c, Temporary Even-aged Management, page 51.

(b). Harvest Cut Block Size and Design
Cutting block size and design will be constrained by silvicultural, water quality, visual and wildlife impacts, by social and economic considerations, and by logging method employed.

Cutting blocks to be tractor logged will be designed to blend with natural terrain features, take advantage of natural screening, and avoid geometric appearance except where silviculture would be sacrificed to do so.

Cutting blocks to be cable yarded will be designed to facilitate harvest and subsequent prescribed burning for site preparation. The negative effects of timber harvest on visual quality will be mitigated where possible.

Table III-6, page 49, provides guidelines for even-aged blocks by silvicultural system and logging/site preparation method.

(c). Site Preparation and Residue Management on Harvest Cut Blocks
Site preparation on slopes less than 45 percent will generally be accomplished by machine piling and burning of logging slash or mechanical scarification. The goal of site preparation will be to randomly expose mineral soil on 40 percent of each block while maintaining approximately 10 tons per acre of woody debris interspersed with the bared mineral soil. Hazard reduction will be a secondary benefit of this treatment. This approach to site preparation and residue management will help preserve site productivity by retaining organic

matter and improve regeneration success by providing favorable microsites. In no case will soil disturbance, logging debris accumulations or organic matter depletions be extreme over an entire block.

Table III-6. Guidelines for Harvest Cut Block Size

Silvicultural System	Slopes less than 45%, Tractor Log, Pile/Burn.		Slopes Greater than 45%, Cable Log, Broadcast Burn.	
	Minimum Size	Maximum Average 1/	Minimum Size	Maximum Average
Clearcut	None/3 2/	15 Acres	5 Acres	15 Acres
Seed Tree	None	15 Acres	5 Acres	15 Acres
Shelterwood	None	25 Acres	5 Acres	25 Acres

1/ Maximum average refers to the average size of the larger blocks on a logging unit. Some blocks may be larger than the maximum average.

2/ There is no minimum size for pile/burn blocks that are prescribed for natural regeneration. Three acres is the minimum size for blocks to be planted.

Site preparation on slopes greater than 45 percent will generally be accomplished by broadcast burning, provided fuel loading exceeds 15 tons per acre in material three inches or less in diameter (1-100 hour time lag fuels). Where fuels are lighter than this, alternatives such as hand scalping or hand piling and burning will be considered. As mentioned previously, the first consideration in the design and layout of blocks to be broadcast burned will be minimizing risk of escaped fire and optimizing duff reduction. To that end blocks will normally be limited to a single aspect and habitat type, have a road at the top and straight sides.

(d). Reforestation of Harvested Blocks
The reforestation goal of the even-aged management component is the natural regeneration of harvested blocks with desired species within two years of site

preparation. Where this goal cannot be achieved because of lack of seed source or because of severe environmental conditions, seeding or planting of containerized seedlings will be accomplished to insure that minimum stocking levels (300 trees acre) are met before additional site preparation is required. (See Action Plan, Forest Development, IV.A. Reforestation).

(4). Intermediate Treatments

Intermediate treatments are appropriate and necessary throughout most of the life of an even-aged stand, starting from the time it is established until, but not including, the time it is harvested and regenerated. Intermediate treatments are concerned with the care, development, and maintenance of existing stands, and include four specific categories of treatments that will be applied to Reservation stands. These include release treatments, thinnings, improvement cuttings, and salvage.

(a). Release Cuttings

Release cuttings (also referred to as precommercial thinnings) including cleaning, liberation, and weeding will be applied once to stands when they have reached the 2-4 inch diameter size class, or are from 15-25 years old. (See Action Plan, Forest Development IV.A.) The object will be to identify and release from competition those crop trees that will be carried forward to be cut for a useable product. Overstory removal or liberation cuttings will be made to free the young stand from trees that were left when the previous stand was harvested or burned. Liberation cuttings include the removal cutting of the seed trees or shelterwood if the removal cutting was delayed. The overstory removal will take place in conjunction with, but prior to the precommercial thinning so that trees damaged in logging the overstory can be removed in the precommercial thinning. When feasible, seed trees and shelterwood will be removed as soon as their purpose has been fulfilled.

(b). Thinnings

Thinnings are cuttings that are made in immature but merchantable stands in order to stimulate growth of crop trees to be left, and to increase the useable yield from the stand. Trees cut in thinnings are merchantable and generate income to the landowner. Thinnings will generally be repeated at 20-30 year intervals in Reservation stands depending on the productive potential of the site, and focus on enhancing the growth and quality of the reserved crop trees. Crop trees will be selected for their phenotypic superiority.

(c). Improvement Cuttings

Improvement cuttings are also made in immature stands most often made in conjunction with thinnings. They differ in purpose from thinnings in that improvement cuttings are used to improve the species composition and quality of a stand by removing merchantable trees of undesirable species and form, damaged and diseased trees, and trees of low vigor and high risk.

(d). Salvage Cuttings

Salvage cuttings will be made for the primary purpose of removing trees that have been or are in imminent danger of being killed by injurious agencies such as insects, diseases, blowdown, and fire. The object is to utilize the injured or dead timber to minimize financial loss. Salvage cuttings will not be made unless they at least pay the expense of the operation.

c. Temporary Even-aged Management

Temporary even-aged management is the classification applied to those stands occurring in habitat type groups B, C, and D that have been temporarily excluded from uneven-aged management. Stands in this component of the uneven-aged management area will be prescribed for an even-aged harvest treatment, either a shelterwood, seedtree or clearcut, when existing stand or site conditions prevent the successful management of the current stand in an uneven-aged mode. Once these cutting blocks have been regenerated, subsequent entries will be aimed at converting these blocks back to uneven-aged management through individual tree or group selection marking, and by providing for the establishment of new age classes at each entry.

The primary stand condition that will dictate a departure from uneven-aged management, is dwarf mistletoe infection. Dwarf mistletoes infect

Douglas-fir, lodgepole pine and western larch trees locally. The percentage of trees infected in a stand is the basis for a stand infection level rating system, (see Action Plan, IV.A. page 98). Management policy calls for the removal of all mistletoe infected trees in an effort to bring this serious diseases problem under control. As a policy, class I infected stands will be prescribed for an even-aged harvest cut and regenerated to a nonhost species, such as ponderosa pine. Class II and III level infections will dictate the same stand treatment where a minimum stocking level in at least two age/size classes cannot be met. Minimum number of crop trees per acre by age/size class are listed below:

Minimum Number of Crop Trees Per Acre	Age/Size Class		Description
60	saplings	-	trees less than 4" DBH
30	poles	-	trees between 4" and 8"
15	young sawtimber	-	trees over 8" but less than 140 yrs. old
3 MBF	mature, overmature sawtimber	-	trees over 140 yrs. old

Root rot centers constitute another stand condition that may dictate a departure from uneven-aged management. Several species of fungi, individually and in complexes, infect the root systems of trees. When infection levels reach a point that tree mortality occurs in clumps or centers and then radiates from these centers, or where individual tree mortality from root disease is common, the policy will be to treat the root diseased portion of stands with an even-aged silvicultural and management prescription which will eliminate species susceptible to the disease(s) and regenerate infected areas to species that can tolerate the particular pathogens.

Centers are most frequently encountered on ecotones between moist Douglas-fir habitat types and grand fir habitat types. Principal species affected are Douglas-fir and grand fir.

Some stand conditions occasionally support a very localized insect infestation that causes continuous damage and tree mortality over a long period of time. The infestations result in understocking and/or elimination of age/size classes. When crop tree stocking drops below minimums described under dwarf mistletoe conditions, above, temporary even-aged prescriptions will provide for harvest of the host species and infested areas will be regenerated to non-host species.

Dwarf Mistletoe infection in Douglas-fir.

The major insect problem is western spruce budworm in grand fir/Douglas-fir dominated stands. Temporary even-aged management will be prescribed for overmature, decadent stands producing no or negative net growth due to forest pest problems. These stands are most often dominated by defective grand fir and occur on grand fir or cedar habitat types. Regeneration will be to seral species.

Severely understocked stands may dictate a rehabilitation harvest. This condition is usually the result of previous attempts to apply uneven-aged silviculture to one of the stand conditions previously described. The basis for deciding whether to manage an understocked uneven-aged stand or to apply an even-aged prescription will depend on whether the previously described crop tree stocking standard can be met.

The primary site factor that may cause a departure from uneven-aged management is slope gradient. The site preparation or scarification required to successfully obtain the natural regeneration of each new age class in uneven-aged management is generally the result of tractor skidding and slash piling. On slopes too steep to tractor skid, cable systems will be used to harvest timber. Cable logging results in very little site preparation so prescribed understory burning is generally the only tool available for preparing the site for natural regeneration. Where prescribed understory burning cannot be used and where natural regeneration cannot be achieved without the use of fire, even-aged management will be applied.

2. Limited Management Area

The limited management category includes areas where the production of wood products is not the primary management objective (see section III.D.2.b. Page 21). Other resource values such as grazing, wildlife, aesthetics, and water will be the optimum land use objective with wood production of secondary importance. The silvicultural systems used in limited management areas will be designed to achieve the objectives of the most important resource values present. Generally, timber harvest will be limited to sanitation/salvage cutting, and no investments will be made in follow-up forest development work such as planting or thinning. Cutting cycles will not be specified. The areas of limited management that are limited due to marginal productivity are nearly all contained in habitat groups A and G.

a. Habitat Group A - Open Pine-Fir Bunchgrass Habitat Types

Habitat group A has limited productivity potential because it consists of hot dry sites, sometimes combined with shallow, rocky soils.

The criteria that will be used to determine whether a particular stand in group A falls in the limited management category are listed below.

1) Less than 50 percent of the area is capable of growing trees.
2) Stocking generally less than 50 square feet of basal area per acre.
3) Potential yield is at least 15 cubic

feet/acre/year but not more than 20 cubic feet/acre/year.

4) Regeneration is scarce or of obvious poor quality and vigor.

b. Habitat Group G - Upper Subalpine Habitat Types

The habitat types included in this grouping occur at the upper end of the timber producing regime where tree growth is restricted by the cold, arctic like climate to approximately 20 cubic feet per acre per year. Density and composition of the stand is highly variable. Some open grown stands in habitat group F having low growth potential may be included in the limited management area.

The primary resource values of the upper, subalpine habitat are: (1) summer range for big game, especially elk; (2) grizzly bear habitat; (3) aesthetics; and (4) watershed protection.

Most of the acreage within this group of habitat types is found on the Mission crest, in the Jocko Primitive Area, and along the Ninemile Divide.

It must be remembered that species composition is highly varied within the stands on these habitat types. Therefore, the prescription as stated will result in the creation of small group selections within the stand as well as small to medium size openings of the canopy in parts of the stand that are primarily non-merchantable yet are interspersed with merchantable trees. With proper sale layout, the application of this concept will enhance the primary resource value of the type. Wildlife browse and forage will be increased in quantity and diversity in the small group selections. The snow pack depth increases in the small openings which may increase water yield available for users further down the drainage. The rate of snowmelt varies with slope, aspect, elevation and stand density (USFS, 1974).

c. Streamside Management Zones

Management of streamsides and wet areas will protect stream ecosystems and maintain high water quality. The streamside management zone consists of the area within 100 feet on either side of streams or the area of riparian vegetation, whichever is larger. The specific resource values and size of the streamside management zone will be determined on a site specific basis by the interdisciplinary team that plans the management activity. See section IV.H.9, page 167, for information on interdisciplinary sale planning.

Generally, the shading affect of the forest on the stream will not be altered, and the riparian areas will be protected from soil disturbance. Impacts such as the accumulation of debris and increased turbidity may occur. Some input of large woody debris 4" in diameter and larger into the stream ecosystem may be beneficial for long-term stream stability (Swanson and Lienkaemper, 1978). Additions of small debris such as needles and small branches are detrimental to fisheries (Moring and Lantz, 1974). Measures including line skidding and directional falling will be used to prevent logging debris from entering streams.

Tribal Natural Resource Department personnel John Butler, Royce Bird, and Jim Darling electrofishing as part of the Flathead River Fisheries Study.

To assure proper timber management within streamside areas, all riparian or water influence zones will be classified as Limited Management Zones. This classification includes areas along perennial streams, intermittent streams, ephemeral streams, springs, seeps, elk wallows, and other wetlands.

Due to the multitude of variables involved in management of riparian or water influence zones, site specific logging method restrictions, marking guidelines, and post logging activities will be thoroughly developed in the Forest Officer's Report for each logging unit. Any management within these zones requires the development of realistic contract requirements and penalties, as well as the strict enforcement of these contract requirements.

Logs will not be skidded across streams with tractors or wheeled skidders. If cable logging systems are used in streamside zones, the logs will be fully suspended when yarded across streams. Log landings should not be located in riparian zones.

The general silvicultural methods for streamside management zones will be selection and salvage. Some mortality will occur and will not be salvaged to provide a continuous supply of snags and large woody debris. Snags are important for certain species of wildlife especially cavity nesting birds. Some input of large woody debris is needed for stream ecosystem stability. Old-growth timber in streamside zones will provide some habitat for old-growth dependent species.

Policies for roads in streamside management zones are discussed in the Action Plan, page 143.

3. Lodgepole Management

A portion of the lodgepole timber types on the Reservation have been set aside for special consideration. The objective for timber management on the lodgepole type is a land base for sustained-yield post and pole production. Management prescriptions in the lodgepole timber types will be designed to utilize existing post and pole products, while regulating the harvest for sustained-yield post and pole production.

The permits section, within the Forestry Branch will have overall lodgepole management responsibilities. All planning for management activities for this portion of the lodgepole pine timber type will be coordinated by that section. Coordination of activities will necessarily involve all Branches at the Flathead Agency and those Tribal Departments involved with management of the lodgepole ecosystem.

Details of lodgepole management are included in this plan under IV.J. of the Action Plan, page 174.

Lodgepole pine stands provide a variety of timber products.

G. Water

Water is an important renewable resource on the Flathead Indian Reservation. The many forested watersheds on Tribal land provide water for irrigation, drinking, hydroelectric power, and other uses for a great many people. Water quality and yield can be significantly affected by silvicultural operations (Konizeski, 1974).

The primary impact of forest management activities on water quality is increased sediment production. Most sediment comes from erosion of logging roads or stream channels near logged areas. Sediment may be produced from roads during road construction or maintenance or when a road has been left unprotected. Unless a road is protected with grass cover some sediment will be generated from the road every year. Sediment also may be produced when natural peak stream flows are increased due to removal of forest vegetation. Large increases in sediment are detrimental to most uses of the water. In planning and executing any timber harvest particular attention will be paid to erosion hazards. These include highly erodable soils (as defined in the

Environmental Impact Assessment for the Flathead Indian Reservation, steep slopes (particularly those with thin soil mantles), areas of high ground water (especially those on steep slopes) and slumps.

Practices that will be used to keep snow melt rates, runoff, and erosion close to pre-harvest levels include careful road design, construction, and maintenance, streamside zone management, uneven-aged management, cutting block size and location restrictions.

Tractor skidding has been shown to have detrimental effects on water quality by increasing overland flow, erosion and soil compaction. Strict supervision of tractor operations in potentially fragile areas will be required.

When considering tractor skidding or piling and scarification on seasonally wet, compactible soil, the logging operation will be scheduled for the drier summer months (July 15 - September 15 approximately) or the winter when enough snow and/or frost is present to protect the soil from compaction.

Proper bridge and culvert design, installation and maintenance are of primary importance to protect water quality. This will entail designing culvert installations to withstand 25-year floods. Moderate quantities of backfill material will be required for good bridge and culvert installation. Culvert discharge must not flow directly onto loose fill. Riprap may be needed at the culvert inlet and outlet. Maintenance of the structure is mandatory to protect the structure and minimize erosion. Erosion from roads will be controlled by limiting road grade, grass seeding, ditching, and installing rolling dips.

Besides increasing the potential for sediment production, timber harvest operations can also increase nutrient influx and water temperature, and decrease dissolved oxygen in surface and sub-surface water. These factors may not have detrimental effects on a particular stream, but sedimentation is the biggest danger to fisheries habitat (Cummins, 1974). Mechanical barriers, such as logs and culverts are potentially an impediment to the movement of fish. Before installing a drainage structure or undertaking any modification of a fish bearing stream a fisheries biologist will be consulted to help determine the best course of action. Additional information about roads and streams is contained in the Action Plan, page 143.

The towns of Polson, Ronan and Hot Springs have Tribal leases for watershed protection on Tribal lands from which they obtain municipal water supplies. The watershed protection leases reserve the right of the Tribes to harvest forest products from the specified watersheds. Hydrologic specialists will be consulted when planning road construction or timber harvest therein.

H. Soils

1. General

Five factors influence soils on the Flathead Indian Reservation: parent material, climate, vegetation, topography, and time. Soil formation is slow on the reservation because the climate is cool and relatively dry. Most of the forest soils forming in partially decomposed bedrock and are creeping downslope because of gravity (Dutton and Nimlos, 1983). Cummins (1974) reports that many lee slopes and north-northwest exposures on the Reservation have deposits of volcanic ash. Additional information on soils and geology of the Reservation is contained in the Environmental Assessment prepared by the University of Montana (1984) and the assessment prepared by Leo Cummins (1974). Chapter 7 of the Cummins report contains a list of information available for the area. The Soil Conservation Service is currently working on a soil survey of Reservation lands and can provide detailed information on specific soils.

2. Maintaining Soil Productivity

As stated in section III,C, page 17, maintaining forest soil productivity is an important objective of this management plan. To maintain forest productivity it is imperative that the surface of our forest soils be protected from erosion, compaction, and displacement. This is necessary because most productivity is concentrated in the surface of soils in the form of organic matter and volcanic ash. Organic matter occurs in and on the soil in the form of litter, decomposed humus, and large woody material in various stages of decomposition. Organic matter accumulation varies with moisture and temperature. Organic matter can hold a great deal of water and nutrients for use by plants, and also is important for mycorrhizae survival. Volcanic ash has chemical and physical properties that allow it to hold relatively high amounts of water and plant nutrients.

The top soil determines how much and how fast water can infiltrate and be stored for immediate and future use by plants. The topsoil also contains most of the nutrients available for tree growth. Bulk density in the surface soil is usually low and thus surface soil provides an excellent medium for root growth. These facts are evident by the abundance of feeder roots in the soil surface.

Because organic matter and volcanic ash occur on the surface of soils, they can be damaged during logging and associated activities. The following sections discuss how loss of soil productivity can occur and the measures that will be used to prevent this loss.

3. Soil Displacement
Soil displacement occurs when the surface soil is removed exposing the less fertile subsoil. This process reduces the productivity of a given site and can make seedling establishment and growth difficult. Displacement may also disrupt mycorrhizal development and nutrient cycling.

   a. Factors Affecting Displacement
      (1). Steep Slopes
      Tractors used on steep slopes can displace surface soil from localized areas.
      (2). Wet Soils
      Tractors used on wet soils may rut and puddle soil, squeezing the surface soil into mounds on either side of the rut.
      (3). Tractor Piling of Logging Slash
      The surface soil is sometimes piled with logging slash.

   b. Methods to Reduce Displacement
      (1). Cable yarding will be used on slopes greater than 45 percent.
      (2). Ground based logging equipment will not be used on wet soils. If soils do not dry out, cable logging will be used or logging will occur only on frozen soils or soils protected with an adequate snow cover. Snow cover is adequate if soil does not show through the snow after equipment passes over an area.
      (3). Equipment operators will be instructed about the importance of keeping the surface soil intact to maintain soil productivity.
      (4). Brush blades will be required on all tractors used to pile slash.

4. Soil Compaction
When soils are compacted, macropore space is reduced, infiltration and gas diffusion rates are decreased, and permeability is reduced. These factors can act singly or together to reduce forest productivity. Soil compaction results when a force is exerted on the surface of a soil. Compaction is increased by vibration, especially when soil moisture is high enough to allow individual soil particles to slide together. Soil compaction reduces soil productivity through the following means:

   1). macropore space is reduced, which in turn affects soil aeration that is important for respiration of both roots and microorganisms. These microoganisms are responsible for nutrient mineralization and nutrient uptake by roots.
   2). infiltration rates are reduced, which increases runoff and erosion thus increasing the chance for sedimentation.

3). bulk density is increased, which can impede root growth and in turn cause shallow rooting and increase the hazard of windthrow.

The amount of compaction caused by logging depends on both soil and non-soil factors.

a. Soil Factors Affecting Compaction

(1). Texture
Fine and medium textured soils are most susceptible to compaction. A large amount of cobbles or gravel in the soil profile adds strength and reduces the hazard of compaction.

(2). Moisture
Wet soils are more susceptible to compaction than are similar dry soils.

(3). Soil Structure
Soils with strong structure are somewhat resistant to soil compaction.

(4). Organic Matter
Organic matter adds strength to soil, thus reducing susceptibility to compaction.

b. Non-soil Factors Affecting Soil Compaction

(1). The type of logging equipment used. For example, standard crawler tractors compared to low ground pressure equipment.

(2). The number of passes equipment makes over an area. The fewer passes the better, although most compaction appears to occur during the first few passes.

(3). The amount of slash on the ground. Slash supports equipment above the ground and distributes the load over a large area.

(4). The amount of snow on the ground. Snow supports equipment and may protect the soil surface from damage.

c. Methods to Reduce Soil Compaction

Soil compaction can be reduced by using logging methods that are compatible with the existing soil and topographic features. These methods include:

1) Restrict skidders to dedicated skid trails that are spaced far enough apart to reduce the area impacted by compaction.
2) Log with tractors on snow. Snow is deep enough if soil does not show through the snow when equipment passes over it.
3) Log on frozen soils.
4) Log using high-lead cable systems.
5) Logging equipment that exert low ground pressure, such as the FMC may be an option on sites where cable logging or winter logging are not practical.

These methods will not be used for all soils, but are necessary on soils that remain wet or are highly susceptible to soil compaction because of specific soil or topographic features. Soils in groups 9, 10, 13, and 14, described on pages 57-59, 272, and 273 of the Environmental Assessment (University of Montana, 1984) are most susceptible to soil compaction. Soils that are dry or are very rocky have low susceptibility to soil compaction.

The above discussion pertains to harvesting timber. Soil productivity can also be reduce during site preparation and slash disposal. These operations often impact soils more than harvesting operations do. Mechanical site preparation will not be used on wet soils susceptible to compaction.

Soil compaction can also result from cattle grazing, especially in riparian areas where moist soils produce abundant forage.

5. Soil Erosion

Soil erosion reduces soil productivity, reduces water quality, degrades fish habitat, and damages road and trails. The following factors affect soil erodibility:

1) Rainfall intensity and overland flow.
2) Soil properties.
3) Slope length, steepness, and shape.
4) Surface cover.

a. Rainfall Intensity and Spring Runoff

The energy of running water detaches and transports soil material. Overland flow results from high intensity rains and spring snow-melt. Overland flow can also detach and transport soil particles. Rainfall impact on bare soils can detach and move soil short distances.

b. Soil Properties

The capability of a soil to resist erosion is a function of its chemical and physical properties. The major factors affecting erodibility are texture, organic matter content, soil structure, and permeability.

1) Texture

Soils with loam, silt loam, or very fine sandy loam textures are highly susceptible to erosion. Soils with sandy clay loam, silty clay loam, and clay loam textures have moderate susceptability to erosion. Soils with clay, silty clay, sandy clay, fine sandy loam, and sandy loam textures have moderately low susceptibility to erosion.

The least erodible soils are loamy sands, sands, loamy coarse sands, and coarse loamy sands.

2) Organic Matter
Soils with high organic matter contents have good soil structure and are resistant to erosion. Organic matter cements soil particles together and increases infiltration rates, which in turn reduces erodability.

3) Permeability
High permeability rates allow water to enter the soil profile thus reducing overland flow and subsequent erosion.

4) Slope, Length, Steepness, and Shape
Long, steep slopes allow running water to gain velocity and detach soil material. Concave slopes concentrate water, increasing the chance for soil erosion.

5) Surface Cover
Surface cover breaks the impact of raindrops, slows runoff, and holds soil in place. Either natural or artificial cover reduces soil erosion.

c. Preventing Soil Erosion
Preventing erosion is most significant for soils with naturally low permeability and high erodibility. (Soil Groups 7 and 13). The following practices will be used to minimize soil erosion:

1) Methods stated in III.H.4.c. above will be used as directed by the interdisciplinary planning team for a project to minimize compaction. Compaction can reduce permeability and increase the chance for overland flow.
2) Disturbance of surface soil and its protective cover of duff and vegetation will be kept to a minimum, especially on steep slopes. Skid trails and firelines on slopes over 45% will be cross drained to divert running water into vegetated areas.
3) Surface cover will be maintained as intact as possible. Large bare areas, such as road cuts and fills will be revegetated as soon as possible. See Action Plan page 149, for more information.
4) Roads will be built to minimize the exposed bare soil and the amount of water that runs down the road surface. Rolled grades of reasonable length and slope reduce erosion. Outsloped roads move water off of the road surface before serious erosion and sedimentation can occur.

6. Chemically Fragile Soils

On page 101 of the 1984 Environmental Assessment, N. Stark defined chemically fragile soils as those soils that would be "unable to grow the next 3 or 4 forest cutting cycles on existing reserves after intensive harvest or hot burns". These soils are said to enter "nutrient shock" caused either by high or low nutrient levels or an imbalance of nutrients. Chemically fragile soils are not thought to be extensive on the Reservation. Soil Groups 1, 4, 6, 19, 20, 21, 22, 23, 24, 25, and 26 are chemically fragile. Refer to pages 60, 61, 62, and 101 in the 1984 Environmental Assessment.

The E.A. provides suggestions for identifying fragile soils. Care is needed to protect the soil resource when these sites are logged.

7. Conclusion

Continued production of forest resources depends on the maintenance of soil productivity. Maintaining soil productivity does not preclude forest management, but may require special practices to protect soils. Future research will provide information about the nutrient requirements for tree growth effects of soil compaction on productivity and the importance of the organic matter enriched surface layers, on nutrient cycling, nutrient balance, and nutrient requirements for good tree growth. As this information becomes available it will be used to make management decisions that will ensure the future productivity of our forests.

I. Range

Range includes all forest and grasslands capable of providing forage for grazing and browsing animals. Range encompasses herbage and browse produced as food for livestock, habitat for wildlife, and the ground cover protecting the soil.

Presently on the Flathead Indian Reservation, approximately 335,000 acres have been identified as range and are being utilized, or have the potential to be utilized by livestock and wildlife. The large majority of this acreage is categorized as commercial forest land, and is subject to multiple uses.

Most reservation rangelands are best suited for summer use, with permit utilization starting in early May and continuing through late October. There are approximately forty active permits held predominantly by Tribal members.
Many factors presently affect the patterns of rangeland utilization. Timber sale road construction is accessing a larger area of forest for livestock use. The creation of transitory range (from timber harvest activities) is increasing livestock forage acreage. This acreage is valuable in that it relieves pressures on primary grazing in riparian habitats. It is also expected that the demand for

rangelands will increase throughout the century.

The importance of the range resource, and its possible impacts on other resource values, makes it important to address multiple use concerns. Forest management prescriptions will consider the physical and biological characteristics that make land suitable for range use. Careful planning and the use of proper management practices should minimize possible multiple resource conflicts and impacts.

"It is assumed that the primary goal of range management is to manage for optimum productivities commensurate with protection of the basic resource of soil, plants, animals, water, and air, on a sustained yield basis" (Cummins, 1974).

Livestock have the potential of changing water quality regimes. Most grazing allocations include riparian areas that receive concentrated livestock use due to lush vegetation, more gentle terrain, and proximity to water. Protection of riparian zones and water quality is dependent on management activities.

Livestock grazing can be detrimental or can enhance the establishment of conifer seedlings, dependent upon the degree of grazing, amount and type of available forage, stage of tree development, season of use, and class of livestock grazed.

Over utilization of the range can reduce survival of trees by compaction of the soil, browsing, trampling and other forms of physical injury. Severe compaction may increase erosion, reduce available water and nutrient assimilation, and eliminate or weaken individual trees to the point they become susceptable to insects and disease. Changes in the microclimate which are unfavorable to seedling production may occur. Long term effects of soil compaction on tree growth, may cause lower site productivity and a lower yield at rotation age. Generally, severe damages are limited to areas where livestock are permitted to congregate and may be of minor importance as compared to other causes of seedling mortality.

In other instances, grazing may increase survival rates of conifer seedlings. Trampling may aid germination by reducing heavy litter and forcing seed into mineral soil. After germination, moderate grazing may aid seedling survival by reducing competition from herbaceous plants. In addition, grazing reduces fine fuels which reduces fire hazards and results in less damage when fires do occur. However, no gain may be expected, if prolonged heavy use is allowed.

The kind of livestock is another variable that influences potential damage to tree seedlings. Damage to tree reproduction by sheep and goats is proven to be more severe than by cattle. Since sheep and goats show greater preference for browse forage than cattle, and are better adapted to grazing steeper topography, more damage to trees can be expected. The kind of stock and their relationship to forage damage should be considered in commercial forest areas; however, with proper management, it is doubtful if much damage would occur in coniferous forests either from sheep or cattle.

Proper forest management will require increased coordination with range management to effect a minimization of adverse impacts and promote possible benefits on all uses.

J. Fish and Wildlife

The various species of wildlife are an important part of the Flathead Indian Reservation. The Reservation has plant communities ranging from dry sagebrush/grasslands in the interior valleys to alpine meadows in the Mission Range. The wildlife is equally diverse and includes representation of several rare species.

Fish and Wildlife are important both as food sources for tribal members and in Tribal cultural and religious life.

The goals of the Wildlife Branch are:

1) To establish a fish and wildlife program on the Flathead Indian Reservation that will provide information on all vertebrate species and their habitats so that land improvement activities or proposed habitat alterations can be evaluated from a fish and wildlife standpoint.

2) To maintain native (or selected non-native) populations of fish and wildlife at levels consistant with Tribal needs/desires and carrying capacities of available habitat.

3) To provide fish and wildlife input on all proposed forest management activities so that positive effects of management activities can be enhanced and negative effects on fish and wildlife shall be mitigated.

4) To supply the Tribes with information pertaining to fish, wildlife, wildlife habitats, pertinent federal laws and acts, etc.

The easiest and most cost effective way to meet these goals is through the careful coordination of the various Tribal and Bureau resource activities. Resource management activities most often change the size and shape of plant communities thus influencing wildlife habitat. While good timber management is not necessarily good wildlife habitat management, it is the most practical, broad-scale tool wildlife managers may use to achieve their goals.

Through proper coordination of wildlife and timber management objectives, effective resource management for both resources can be achieved. Because wildlife species are complex and mobile, most often an area larger than a timber sale needs to be analyzed from the wildlife view point. The cumulative impacts of all forest activities need to be addressed. All phases of the forest management operation (presale, timber sale and forest development operations) will be analyzed in the Forest Officer's Report. Baseline data will be collected for these land management decisions throughout the planning process. For cumulative effects to be properly addressed, a mapping process comparable to the Cumulative Impact Study on the Glacier View Ranger District (U.S.F.S. 1981) is necessary. During this management period a project should be initiated to produce these overlays.

With the great diversity of wildlife species and their habitats on the the Flathead Indian Reservation, no single document can explain all the implications of wildlife-timber management relationships. Selected topics presented here are ungulates, old-growth timber dependent species, endangered and threatened species, and road management. For a general review of wildlife-forestry interactions see Thomas (1979) and literature cited therein.

1. Ungulates

   Ungulates include both white-tailed and mule deer, elk, moose, bighorn sheep and mountain goats. These species are widely distributed and have diverse habitat requirements and preferences. The differences between a habitat preference and a requirement is academic if the animals either abandon an area or have to expend more energy traveling over their home range if a habitat variable is changed.

   Habitat prescriptions will be tailored for a particular species on a particular range. For example elk and mule deer have intermediate cover/forage needs. White-tailed deer will need more coverage; bighorn sheep need less cover. Mountain goats are little affected by timber management on their summer range; yet they can be exterminated on their winter range by improper road management (Chadwick, 1974).

   Reserve stands, adjacent to cutting units, used as cover by wildlife need to be large enough to provide security, thermal and wind protection, to prevent blowdown and to provide management sized units to allow for future options. Cutting units and reserve stands which are too small will not result in the desired increased diversity. Cutting units up to 40 acres are recommended. Elk generally will not forage more than 600' from the edge of their hiding cover, therefore even-aged blocks should not exceed 18 chains (1188 feet) in width. Subsequent harvest of the reserve unit will be limited to areas adjacent to previously harvested blocks which have regenerated to the point of usable hiding/thermal cover. These security/thermal cover areas need to be at least 30-40 acres. Desirable species for providing thermal cover are Douglas-fir, spruce, western redcedar, and ponderosa pine. Trees should be 12" dbh with a canopy closure of 70% or greater and a canopy height of at least 40 feet.

Tribal game wardens with captured mule deer.

Security cover is defined as a vegetated area at least 3 sight distances in width. (One sight distance = that distance at which an adult elk is not visible.)

As a rule of thumb, forest management will use as a guideline a 40/60 total cover to forage ratio. Optimum habitat will have 20% of the coverage in security cover status, 10% in thermal cover and the remaining 10% in either category.

Slash accumulations including roadway slash will be managed to allow for free movement of big game over the range. Broadcast burning is the preferred slash disposal method to enhance both movement and forage quality and yield. Slash treatments in decreasing order of preference are: broadcast burn (fall), broadcast burn (spring), cat-pile and burn, and lop and scatter. In designated wildlife areas, heavy slash accumulations will be treated.

2. Big Game Management Units
The Reservation has been divided into management units as shown in figure III-2, page 74. Big game species that will be given primary consideration for habitat management within each management unit are designated as featured species.

Table III-7. Featured Big Game Species by Management Unit.

Featured Species	Other Species Present
CAMAS	
bighorn sheep	white-tailed deer
mule deer	black bear
elk	
moose Flathead River	
Road Mgmt.: 2 miles or less per section	
DIXON	
elk	white-tailed deer
mule deer	black bear
moose	
bighorn sheep future transplant site	
Road Mgmt.: Seasonal closures, 1-2 miles on winter range; some closed areas for calving.	
EVARO	
elk	moose
mule deer	black bear
white-tailed deer	
grizzly bear	
Road Mgmt.: 1-2 mi./section.	

FERRY BASIN

mule deer
white-tailed deer
elk
moose Flathead River

black bear

Road Mgmt.: 1 mi. or less/section; plan for mule deer & elk.

FINLEY POINT

white-tailed deer

black bear

Road Mgmt.: As developed, mostly private land.

HOG HEAVEN

mule deer west of powerline
white-tailed deer east of powerline
elk
bighorn sheep future transplant site

black bear

Road Mgmt.: 1 mi./section.

HOT SPRINGS

moose
white-tailed deer
elk south of Welcome Springs Creek

mule deer
black bear

Road Mgmt.: 1-3 mi./section; seasonal closures.

IRVINE

mule deer
elk
white-tailed deer Irvine Flats

moose
black bear

Road Mgmt.: 1 mi./section

JETTE

white-tailed deer
elk

mule deer
black bear

Road Mgmt.: With elk and deer: 1 mi./section.
With deer: up to 2 mi./section.

JOCKO

elk
white-tailed deer on flats between Agency and Cold Creeks
mule deer

black bear

mountain goats
grizzly bear
moose South Fork Jocko River

Road Mgmt.: restricted area-South Fork; 1-2 mi./section; seasonal closures.

MISSIONS

white-tailed deer in valley
mule deer in mountains
elk
mountain goats
grizzly bear
moose
black bear

Road Mgmt.: 1-2 mi./section; seasonal closures; utilize Wilderness boundary.

MISSION VALLEY

white-tailed deer
grizzly bear
elk
moose
black bear

Road Mgmt.: As necessary; primarily private land.

NORTH MISSIONS

white-tailed deer
mule deer on slopes
elk
moose
black bear

Road Mgmt.: 1 mi./section.

OLIVER POINT

mule deer
white-tailed deer along Flathead River
elk
black bear

Road Mgmt.: 1 mi./section.

PISTOL/JAMMER

elk
mule deer
grizzly bear
moose
white-tailed deer
black bear

Road Mgmt.: 1 mi./section; seasonal closures for calving.

SCHMITZ

mule deer
moose

elk
mountain goats
grizzly bear
white-tailed deer
black bear

Road Mgmt.: 1-2 mi./section; seasonal closures; utilize Wilderness boundary.

BIG GAME MANAGEMENT UNITS

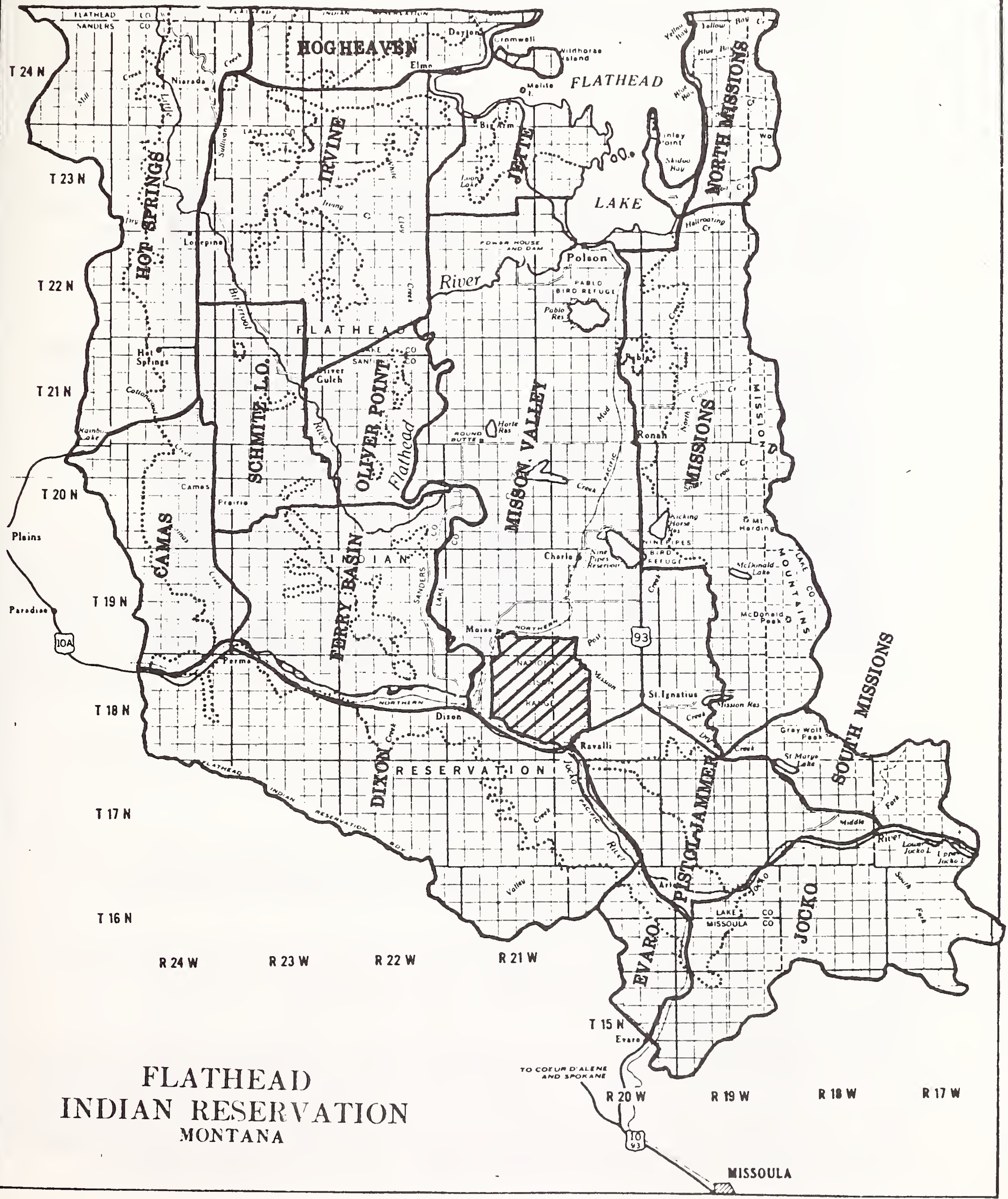


Figure III - 2

3. Summer Range

Wildife specialists will identify critical summer habitat as part of timber sale planning and suggest optimum cover/forage ratios for each area. This ratio should be realized on the ground with an interspersion of these cover and forage areas in a close enough proximity so as to not preclude active foraging, movement or other use.

The planning of timber sales located in summer range will include provisions for a security area adjacent to the disturbed area for the duration of the sale. These security areas should be on the scale of 3000 acres. These security areas should be adjacent to and easily accessible by big game dispersing from the disturbed area and the dividing ridgelines should be protected from mechanical activity. These areas should also contain a fairly large forested area at the head of a drainage.

Where timber sales progress from one drainage to the next, all activities should be completed in one drainage before any mechanized and/or intensive activity is commenced in the adjacent drainage. When such activities are necessary logging activities should begin at the end of the main haul road so that the log trucks need not roll through drainages which have just been logged and considered closed.

Habitat diversity provided by small block size (10-40 acres) is a key to optimum big game use. Forage will be generally unused if there is no effective cover within 10 chains. Timber managers should visualize the range as a collection of small areas. If these smaller areas have desirable characteristics the larger summer range will be desirable also. Thermal cover areas on summer range will be between 30-60 acres.

Where identified licks and wallows are present, these will be preserved and buffered from view of activity during late spring and summer.

Where identified travel routes exist, these will be maintained with security cover wide enough to allow unhampered movement. A width of at least two sight distances is required.

Mechanized activity will be restricted in traditional birthing areas from May 1st through July 15th.

4. Winter Range

Generally, 10% of all usable big game habitat is suitable for winter range. These areas are often utilized differently from area to area and no single set of managerial guidelines will suffice for all winter ranges. Therefore wildlife specialists will be consulted for each proposed timber sale to delineate the strategic areas and to

Mike Durglo Jr. inspecting radio collar on bighorn sheep.

outline methods to maintain or enhance the winter use of the specific area.

Lands located at or below 5500 feet on southern aspects are generally considered optimal for winter use by elk, deer and bighorn sheep. Management objectives in winter ranges should be to maintain optimal habitat quality or to manipulate timber stand conditions to attain a favorable balance between thermal cover hiding cover, and increased forage production.

Generally animals will remove themselves from any area with mechanized activity to a vicinity which produces a topographical line-of-sight barrier. Therefore any logging or road building activities in actively utilized winter range will be restricted to the summer and fall months.

For white-tailed deer winter ranges in areas of deep snow cover, small clearcuts (10 acres or less) or group selection cutting is desirable even though this type of treatment may not be necessary from a timber management standpoint. This type of cutting is necessary for proper use by the deer of their winter range.

Forest management activities should occur expeditiously when big game is not in the vicinity because the time of disturbance is more critical than the severity of disturbance.

4. Old-Growth Species
Certain species of wildlife require either large trees or an old-growth timber stand for either all or part of their life-cycle. For example, eagles (both golden and bald) require large trees for their large nests. Pileated woodpeckers nest in relic trees in a younger-age stand (McClelland, 1977). Species requiring an old-growth component mainly occur within the ponderosa pine/Douglas-fir/larch zone of the commercial forest. However, pine martin and goshawks require the structural complexity of an old-growth stand. These species usually occur in the subalpine fir/spruce zone.

Old growth ponderosa pine.

The wildlife goal is to provide adequate habitat for these and other species throughout the Reservation. The old-growth component at present can be supplied by not requiring the cutting of all snags on a timber sale (especially those greater than 200 ft. from a road) and by managing for old-growth in streamside management zones. Leaving of some ponderosa pine and western larch seed trees will also help provide the old-growth component for the future.

Observations of species requiring old-growth stands will be reported to the Wildlife Branch. A specific management prescription will be developed for each area to insure minimal impact on these species in the next 10 years.

5. Endangered and Threatened Species

Four species listed under the Endangered Species Act (93-205) occur on the Flathead Indian Reservation. Listed species are either in danger of extinction (Bald eagle, gray wolf, and peregrine falcon) or threatened with extinction (grizzly bear). Section 7 of the Endangered Species Act states:

> "The Secretary shall review other programs administered by him and utilize such programs in furtherance of the purposes of this Act. All other federal departments and agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and theatened species listed pursuant to section 4 of this Act and by taking such action necessary to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of such endangered speices and threatened species or result in the destruction or modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with the affected States, to be critical."

PL-93-205. Sec. 7, Dec. 28, 1973 Stat. 892. When an activity is proposed the Wildlife Branch will make a determination if it may effect a listed species. If there is a "may-effect" determination, then consultation must proceed with the U.S. Fish and Wildlife Service. This consultation has been a smooth process.

a. Grizzly Bears

Grizzly bears are listed as being threatened with extinction. On the Flathead Reservation the population is low with a declining trend. They occur in high densities in the Mission Mountains between Ronan and St. Ignatius; elsewhere on the Reservation they occur at lower densities. A Management Plan for the Grizzly bears in the Mission Mountains is prepared (CS&KT and BIA, 1980). Specifics of bear management policy are contained therein plus a summary of the research data that is the basis for the plan.

To aid in the collection data to monitor the grizzly bear popluations, all personnel will report all sightings and signs of grizzly bears.

Generally, critical summer habitat and winter denning areas for Grizzly bears are the same areas as summer or critical summer habitat for elk and deer. The management activities and methods will be beneficial for the bears if they are also beneficial to the deer and elk, however some of the constraints recommended for deer or elk are critical for grizzly bears. The policy shall be to maintain or enhance identified grizzly bear habitat.

The most influential factor in bear behavior is human activity. Nearly any activity, especially motorized activity, will displace the bears from the immediate vicinity to a point at least out of sight and earshot of the disturbance, much the same as elk. For this reason, in areas of suspected bear habitation forest managers must follow the guidelines established in the elk summer range section concerning security area requirements.

Effective road management is the primary method of maintaining or protecting bear range where such range overlaps with forest management areas. Effective road closure is critical to prevent human-bear encounters and to maximize the use potential of the already diminishing bear habitat on the Reservation. Whenever roads, of necessity, cross identified or potential bear travel corridors maximum cover must be maintained along the roadsides in these zones. Roads should be of a low standard with a minimum of cut and fill. These area shall be identified by the wildlife staff. Roads in valley bottoms, riparian zones and low elevation wet areas within identified Grizzly bear habitat are important spring use areas. Roads must be closed after timber sales activities are completed or seasonally closed when access is required.

TABLE III-7

GRIZZLY BEAR HABITAT

Seasonal activity standards within habitat components to minimize disturbance from timber harvest activities, road construction and motorized vehicle access. None means no activity should occur within the component during this season. OK means activity will not be detrimental in that season.

Component Name	Winter Dec. 1-April 14	Spring Apr. 15-June 15	Summer June 16-Aug. 30	Autumn Sept. 1-Nov. 30
Snowchute/sidehill park	none	none	OK	until 10/15
Snowchute/shrubfield	OK	none	none	none
Sidehill park	none	OK	OK	none
Shrubfield	OK	OK	until 8/1	none
Timbered sidehill park	none	OK	none	until 10/15
Wet meadow	OK	none	OK	none
Alpine slabrock	none	OK	none	none
Mid-low elev. slabrock	none	OK	OK	until 10/15
Talus/scree/rock	none	OK	none	none
Snowfield	---	OK	OK	OK
Riparian zone	OK	none	OK	none
Riparian zone/cut	OK	none	OK	none
Road 1/	OK	---	---	---
Cut	OK	OK	until 8/1	none
Timbered shrubfield	OK	OK	until 8/1	none
Timber	OK	OK	OK	OK
Marsh	OK	none	OK	OK
Agricultural lands 2/	OK	none	OK	none
Seep areas	OK	none	none	none

1/ Disturbance is not applicable to road component. When components are adjacent to roads in areas with little vertical relief, or within visual access of a road in areas with significant vertical relief, and the limitation table suggests no disturbance for that component during that season, then the road should be closed. Note OK in winter relates to snowmachines on open road.

2/ This limitation applies to harvest of timber on lands adjacent to agricultural lands which provide visual cover and bedding areas during the spring and fall on the Mission west slopes.

(Source: F.I.R. GRIZZLY BEAR MANAGEMENT PLAN, 1981)

Grizzly bear photographed in the vicinity of Ashley Creek.

Visual cover must be maintained along streams, around wet areas, along ridgetops and adjacent to major habitat components which are important to diversity in an area such as snow chutes, shrubfields, sidehill parks and slabrock areas. If roads in Grizzly bear habitat areas cannot be closed altogether, the following alternative recommendation should be considered:

1) Where roads access critical habitat (areas containing a high habitat diversity) these roads will not be open to public access

2) Roads entering areas of limited habitat diversity may be compatible with bear use. Access should be limited to the summer season, approximately June 16 thru August 30.

3) Firewood cutting is limited to 3 years after timber harvest at which time the roads should be permanently closed.

Slash disposal recommendations for grizzly bear habitat are the same as previously discussed for elk.

Clearcuts or seed tree units, designed to accomodate bear foraging as well as timber management will fail in their wildlife objectives unless the bears are able to feel secure in the units while feeding. Therefore these units should be screened from roadside view by a strip of vegetative cover where possible.

Grizzly bear density is high in the region between Mollman Creek and Dry Creek. The Grizzly Bear Management Plan (CS&KT and BIA 1980) states that road and timber management in this area should only be attempted with extreme care, if at all. Presently, habitat improvement for grizzly bears is a new technique. Presently this area is deferred from timber management.

b. Bald Eagles

Bald eagles are currently endangered with extinction. Three nest-territories occur on the Flathead Indian Reservation; large numbers (approximately 8 percent of the total number of bald eagles wintering south of Canada) migrate through the Reservation each winter.

Eagles often use a tree in the old growth component for their daily perch sites. This type of tree needs to be maintained and perpetuated adjacent to all major waterways. Eagles most often roost in communal sites with a specific tree structure; these sites may be as far as 20 miles from their feeding areas. These roosts must be identified and data collected on their vegetative structure so they may be protected and maintained into the future.

The lower Flathead River is intensively used by Bald eagles and other raptors. Timber along the lower River is not part of the timber management base.

c. Rocky Mountain Timber Wolf

The wolf is listed as being endangered with extinction. Occasional sightings occur on the Reservation, especially in or near the Mission Mountains. All sightings and signs need to be reported immediately to the Wildlife Branch. Present forest management guidelines for wolves require that 100 percent of the elk management guidelines be followed and road management, as outlined for other species, be implemented.

d. Peregrine Falcon

Peregrine are cliff nesting falcons faced with extinction. All sightings, especially in the nesting season, must be immediately reported to the wildlife branch. Management guidelines require no disturbance adjacent to an eyrie and careful road management. Sales with cliff nesting potential will be surveyed for peregrine and prairie falcons as part of the interdisciplinary sale preparation procedure.

6. Road Management and Fish and Wildlife
Road management is an underlying theme in this section. Without a proper road management plan, the best habitat prescription will be less effective than planned. Wildlife biologists and fisheries biologists will be consulted regarding all forest road activities that could affect the fish and wildlife resources.

Roads should be designed and constructed to minimize adverse impacts on animal movement and hunting potential. Roads should avoid these sensitive areas. If this is infeasible the following mitigating factors should be employed:

a) Maintain frequent dense cover areas adjacent to the road especially at game trails.

b) Avoid saddles or low divides frequented by game for crossing ridges between drainages.

c) Construct low standard roads with minimum cut/fill slopes.

d) Dispose of right-of-way slash at trail crossings so as to not inhibit movement. (U.S.F.S. et al, 1982a)

e) Avoid long straight stretches.

f) Avoid productive forage areas and moist sites. (U.S.F.S. et al, 1982a)

g) All permanent culverts in fish bearing streams should be installed on the grade of the original stream and have resting pools at the inlet and outlet.

In any sale area, temporary or spur roads should be permanently closed. Where this is not possible temporary road closures should be utilized to protect important habitat and ranges during critical seasons of use. See Action Plan, IV.C,D. page 137 for more information on forest roads.

K. Aesthetics
Of major significance on the Flathead Indian Reservation is public concern over the impact of timber harvest activities on the forests' aesthetic quality. Social judgments of visual disturbances reflect personal aesthetic value con-

cepts. The fragility and sensitivity of the visual resource can be adversely affected by any major forest disturbance. Emphasis on cost effective resource management will result in changes to the natural appearance of the landscape. Timber management will always attempt to mitigate adverse aesthetic impacts through established management policy and prescription.

The visual resource is a composite of basic terrains, geological features, vegetative patterns, and land use effects that typify a land unit. This resource influences the units' visual appeal to visitors. "The visual quality objective (VQO) is a desired level of occurence based on physical and sociological characteristics of an area". (Lolo National Forest Plan - Draft Environmental Impact Statement, 1982.). The VQO of an area identifies the acceptable amount of landscape alterations, whether they are retentions, modifications, or enhancements of the visual resource.

View of Mount Harding.

Scenic areas on the Flathead Indian Reservation that receive special visual quality consideration include areas viewed from major highways, homesites, communities, recreation facilities, Flathead Lake forest roads, and trails. Some areas are more visually sensitive than others to management activities. Special visual quality protection must be given to the Mission Range, Flathead River, and the Upper Jocko watershed. The VQO in these special areas should retain the visual resource so mans' activities are not evident to the casual observer. Temporary VQO departures, to protect long term visual values, may be justifiable in areas endangered by insect and disease epidemics.

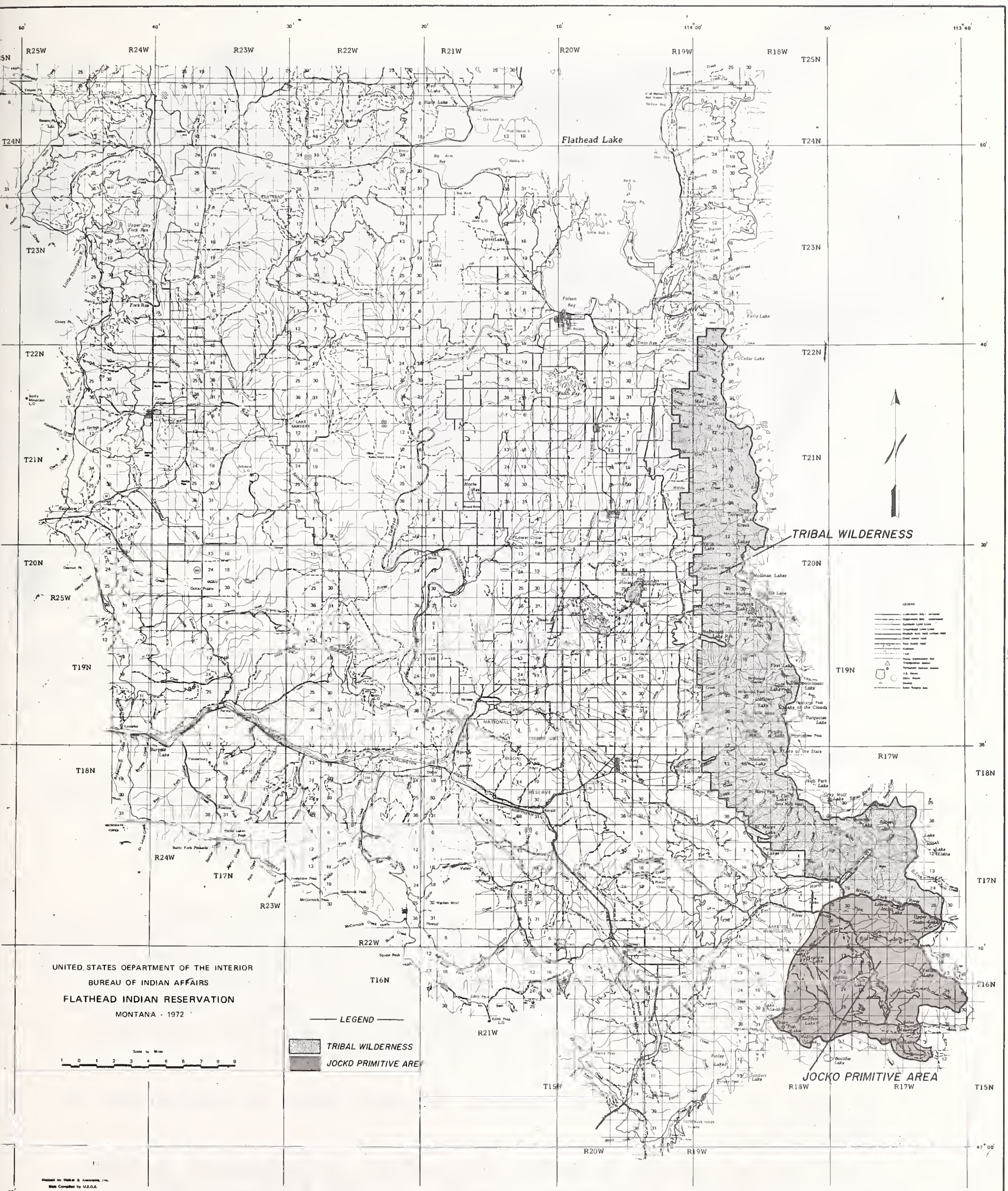
Tribal forest resources represent actual and potential products that contribute to the income and employment of Tribal members. Practices and principles that determine visual quality objectives should include an emphasis on cost effective resources management. Modification of the forest appearance must be viewed as an expected by-product of applied management practices. The compatibility of timber management and visual resources must be attained through careful evaluations of timber sale layout, road plans, site preparation costs, and visual quality objectives.
Even though aesthetic qualities are restored with time, management must provide for the maintenance of visual qualities commensurate with basic visual philosphies and timber utilization realities. Commercial timberlands will be harvested by prescribed methods based on habitat group, physical site conditions, and silvicultural objectives with management following guidelines for visual quality modification.

L. Recreation

Recreation activities within the forest include hunting, fishing, firewood cutting, berry picking, driving for pleasure, backpacking, cross country skiing, and snowmobiling. The Mission Mountain Wilderness and the Jocko Primitive Area, comprise a portion of the non-commercial forest where there is no timber harvest (see Figure III-3). The Mission Mountains Tribal Wilderness Management Plan (CS&KT, 1982) contains the policies for this specific area.

Recently, A Mission Wilderness Buffer Zone Management Plan (CS&KT 1986) has been prepared. This plan describes the policies for Tribal lands located between the wilderness boundary and the "A" canal. This plan provides for visual, wildlife, and recreation use emphasis. Timber harvest is limited to selective cutting only.

Where timber production has been determined to be the primary resource value of the land base, timber management practices will incorporate methods to minimize areas of conflict between timber management and recreation use. Mitigations will be coordinated through the Tribe and the Tribal Natural Resources Department.



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
FLATHEAD INDIAN RESERVATION
MONTANA - 1972

Fred Matt, Wildland Recreation Department climbing the Garden Wall in the Mission Mountain Tribal Wilderness.

M. Cultural Resources

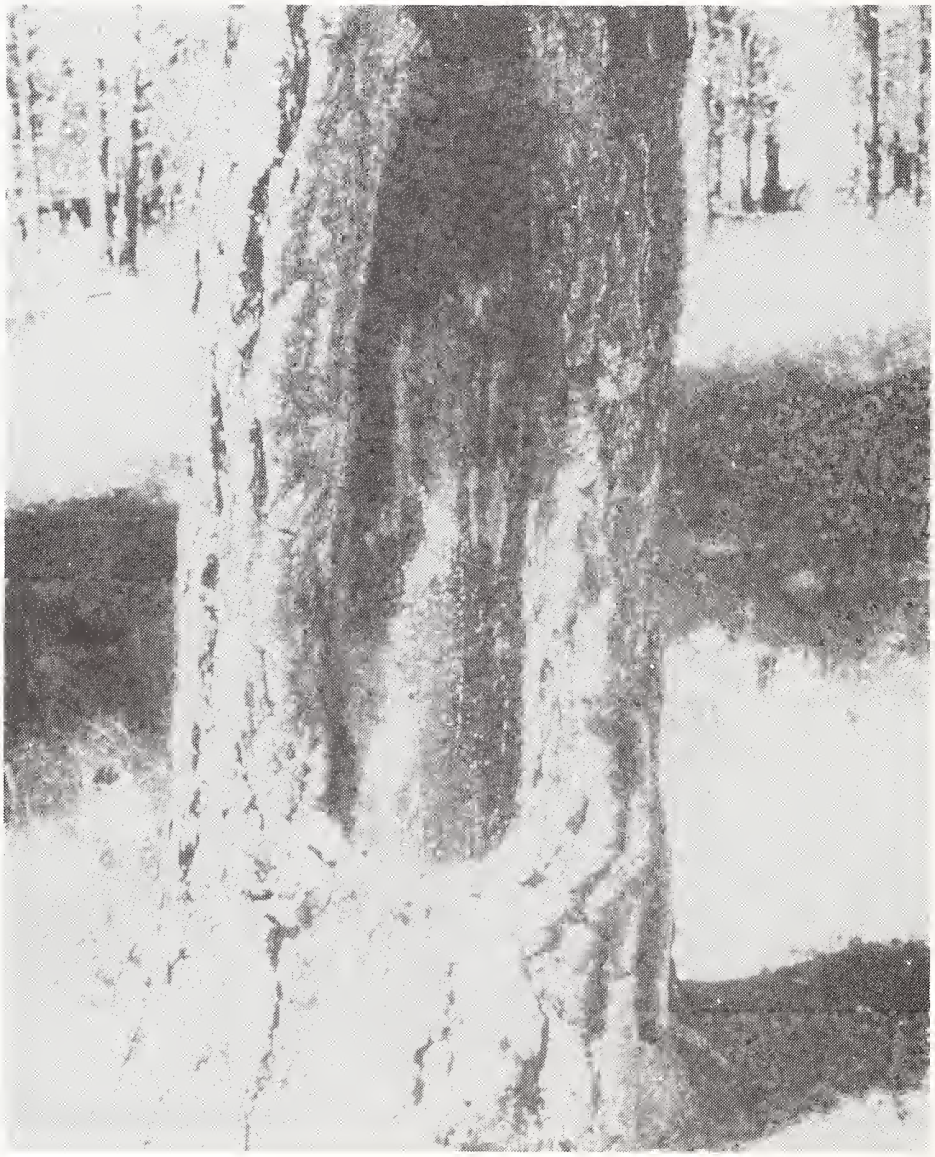
Forest Management activities will provide for the protection of prehistoric sites, buildings, objects, antiquities of local, regional or national significance and cultural resources.

Cultural surveys will be made by the Flathead Cultural Committee and the Kootenai Culture Committee for all ground disturbing activities. Requests for cultural clearance will be made through the Agency Environmental Coordinator and submitted to both committees for each project. Mitigation measures developed by the Committees to protect cultural resources will be made a part of project plans.

A copy of the cultural survey request form is contained in Appendix J.

Information about cultural resources is contained in the Environmental Assessment (University of Montana, 1984). Individuals who want to know more about cultural resources should contact the Flathead Culture Committee in St. Ignatius and the Kootenai Culture Committee in Elmo.

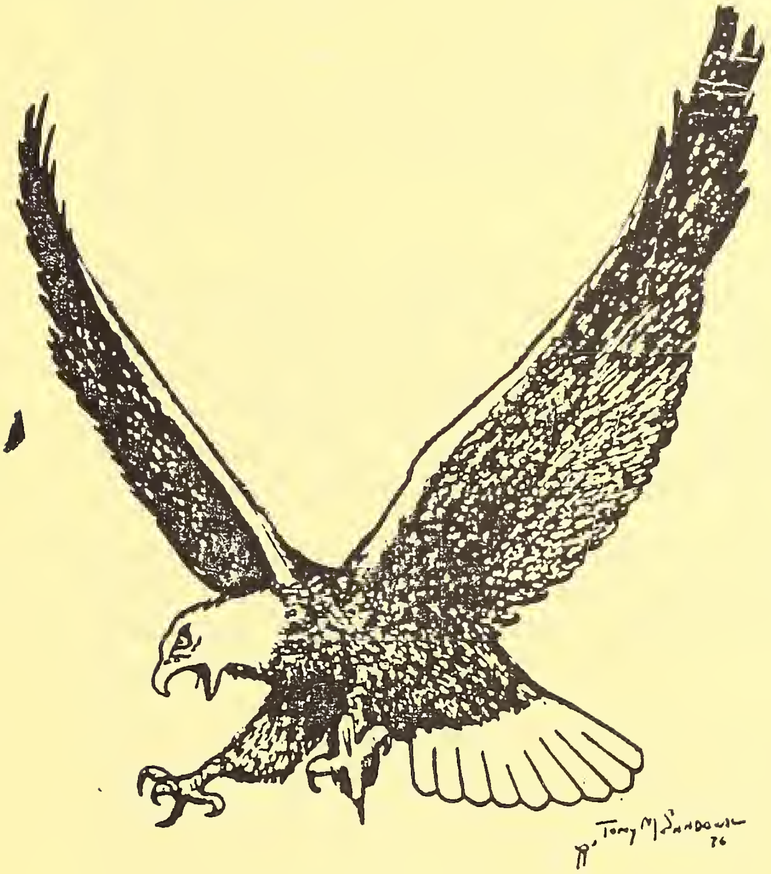
Mitch Smallsalmon pointing out feature at Painted Rocks.



Scar tree or "sugar tree".

Chapter IV

ACTION PLAN



IV. ACTION PLAN

A. Forest Development Program

1. General

The 1972-1981 planning period was characterized by a steady expansion of the size and scope of the Forest Development Program from its inception in the late 60's. The first containerized greenhouse became operational in 1975 and the second in 1979 with a collective capacity of 800,000 seedlings yearly. Site preparation equipment was added in 1977, and a Timber Stand Improvement Forester position was established in 1978.

a. History and Purpose

The reforestation program has been developed on the basis of a systems approach, with several alternative strategies that include cone collection and processing, seed storage, greenhouse sowing, growing, caching, outplanting, evaluations, data storage, and tracking.

Three Bureau crawler-tractors, augment both the Reforestation and Timber Stand Improvement Programs through such activities as snow plowing, road construction, scarification, slash piling and skidding. This equipment along with support equipment is operated by three career-seasonal equipment operators and two laborers.

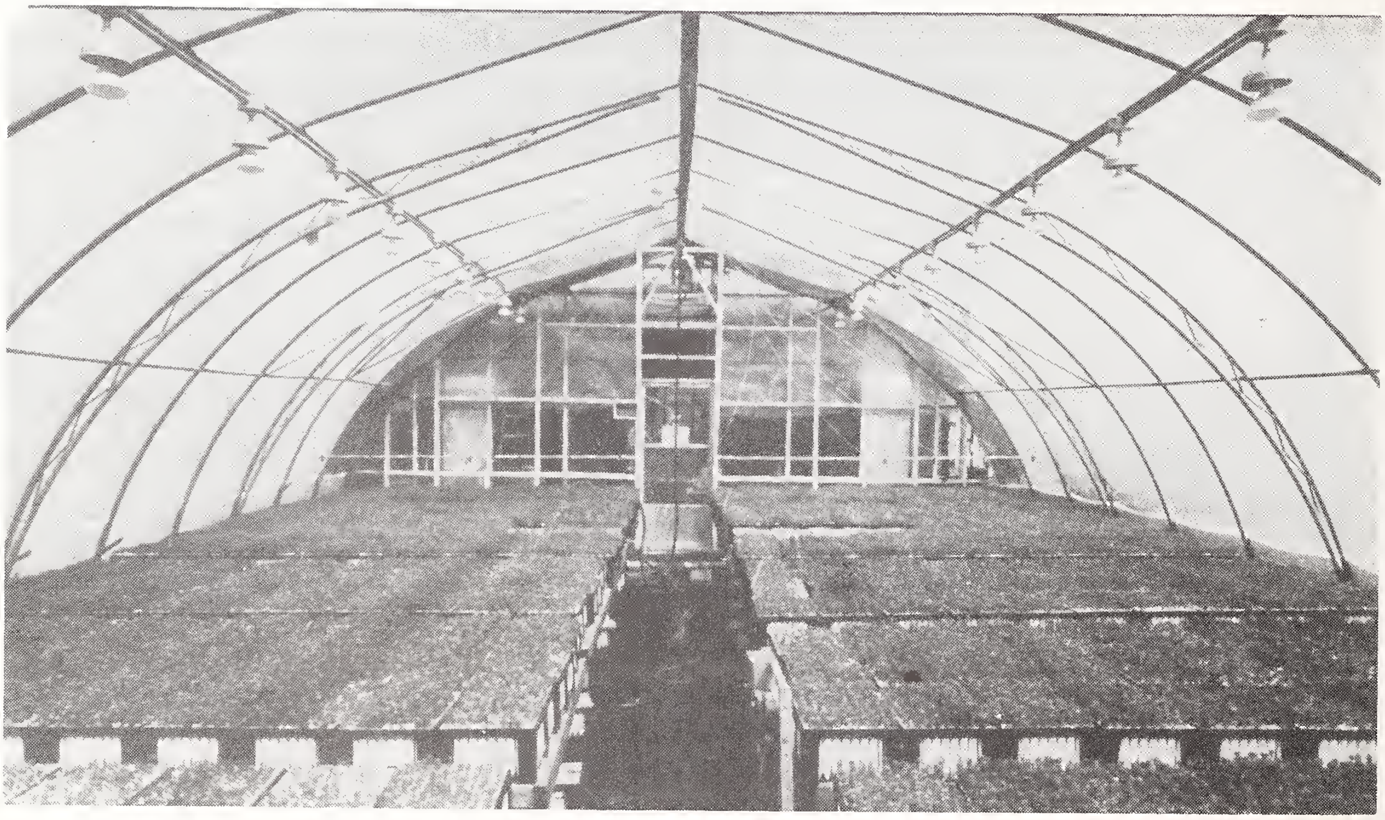
Over 50,000 acres of timber stand improvement work have been completed since an organized program began in 1969. This includes thinning and mistletoe control work.

The program is responsible for insect and disease detection and control projects. Reservation-wide surveys and inspections supplement Forest Service surveys to develop a plan of action to meet specific problems as they arise and monitor potential problems. The program is also committed to a tree improvement plan. Involvement began early in the last management period with the selection of two ponderosa pine "plus" stands, and now includes a planned, long term improvement program for three major species.

b. Organization

Presently, the Forest Development Section is staffed by the following full-time Bureau staff: Forest Development Officer, Reforestation Forester, Timber Stand Improvement Forester, Reforestation Technician and Tree Improvement

Specialist. Tribal staff includes: a TSI Contract Officer, three TSI Technicians and a Greenhouseman. Numerous part-time employees are hired to meet peak work loads in the greenhouse operation, for planting, regeneration surveys and to carryout force account timber stand improvement work. Support is lent to the program by a secretary and Director of the Tribal Forest Management Enterprise (TFME). A Memorandum of Understanding between the Confederated Salish and Kootenai Tribes and the Bureau of Indian Affairs serves as an interlocking agreement providing for cooperation in terms of funding, technical supervision and assistance, training, and the furnishing of labor, supplies, tools, equipment and services for mutual use of both parties.



Three month old tree seedlings in TFME/BIA Forestry Greenhouse at Ronan (Division of Plant Parenthood).

c. Changes for the 1982-1991 Planning Period

Some changes of emphasis should be seen in the next ten years. These include:

(1). Increase emphasis on multiple use and interdisciplinary planning for forest development projects. Projects will be modified and scheduled to insure non-timber resources such as soils, water, wildlife, and aesthetics are protected.

(2). Refine existing timber stand improvement and reforestation practices. Stocking guidelines will be developed that are more site specific than those currently used. Mistletoe control projects will be evaluated for their cost and biological effectiveness. Reforestation and site-preparation techniques need further analysis to pursue the most effective strategies.

(3). Continue precommercial thinning in young, vigorous stands thus far unmanaged. Increase acres treated of timbered sites characterized by low volumes, decadent understories and good sites, i.e., rehabilitation projects.

(4). Continue and expand developmental projects. Promote cooperative studies in tree improvement, and a commercial seed orchard should begin production. Analysis of the response of several commercial species to fertilizer applciations, on a variety of sites will be carried out; commercial application of fertilizer may be initiated if tests show favorable results. The pursuit of more effective means of site preparation on steep ground will continue. Fire, chemical and mechanical methods will be explored.

2. Thinning

In many instances, much of the wood produced in overstocked stands is lost on trees that die before they reach a usable size. This is especially true for dense lodgepole pine and western larch stands occurring on the Reservation. Many dense ponderosa pine and Douglas-fir stands may reach or approach this situation also. Stand density control (thinning) offers an important means of increasing the production of usable wood. A program of timely thinnings, designed to capture a larger share of the potential yield and enhance tree vigor, should greatly increase the production of usable wood. Following is a list of some of the planning considerations for this program.

a. Prescription Writing - The components of any prescription should include five elements:

1) Stand reconnaissance and data gathering,
2) Evaluation of data,
3) Development of alternatives,
4) Treatment,
5) Evaluation.

The process may be accomplished quickly and be largely a mental exercise, but still should be followed. Local stand-exam procedures have been developed along with data storage, retrieval, and summarization methods. Once data has been coded onto magnetic disks, it can be quickly stored, and then arrayed into a number of helpful tables. Further, stand and tree models are readily available to project alternative treatments for comparison. These tools allow one to correlate stand characteristics to statistical data and visualize probable consequences of a treatment. With experience a `catalog ' of typical stands with a series of displayed alternatives and results can be built, reducing the need for formal examinations on similar stands.

Statistically sound stand-exam procedures can be costly if used indiscriminately, but the failure to employ such `state-of-the-art' tools is also costly.

b. Stand Selection Considerations
All of the following factors will be considered in the process of prioritizing treatment areas. Comments are made assuming all factors, other than the one being considered, are equal.

(1). Site - Most productive sites will be scheduled first. Generally speaking, site potential may be ranked by habitat types in the following descending order of productivity; grand fir series, alpine fir series, Douglas-fir series, ponderosa pine series. Groupings of habitat types developed locally should define productivity classes more specifically. (See Section III.D.4)

(2). Age - Sapling stands will receive priority for treatment over pole stands. Thinning should be initiated in stands as early as possible, but not before some dominance becomes evident, allowing for some early genetic gains through the selection of good pheno-types.

(3). Average Stand Diameter - Precommerical thinning will be favored in stands where the average crop tree diameter will not be ingrown into the merchantable class by next entry. Second priority would be thinnings from below where larger crop trees (likely ingrowth) will be further released through removal of suppressed and intermediate trees, generally less than 5" DBH. Maximum cut diameters should be flexible, considering site as well as future utilization standards and entry periods.

(4). Stand Vigor - Crop trees will be comprised of dominant and co-dominant trees with at least a 30% crown ratio. Crown ratio only partially expains tree growth. Crown width and general vigor should also be carefully assessed. More vigorous stands should be selected over less vigorous. All things equal, top priority will be to prevent suppression.

(5). Harvest Schedule of Area - Thinning operations will be scheduled as an immediate follow-up to harvest operations to shorten total treatment time and enhance release of the understory.

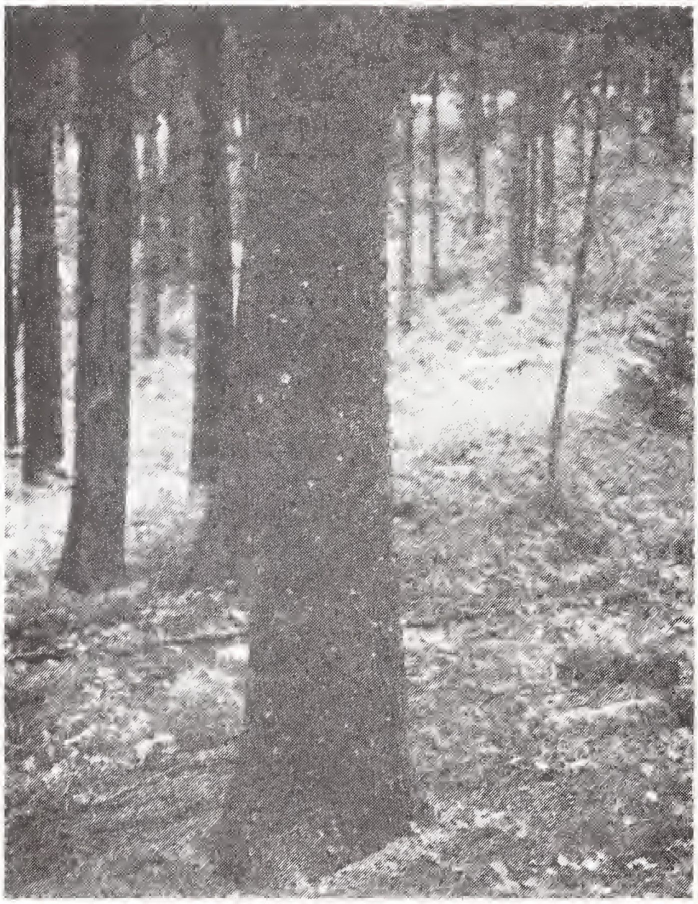
(6). Potential Insect Problems - This will be a prime consideration for thinning in ponderosa pine stands in terms of reducing the potential for Ips or Mountain pine beetle outbreaks. Care must be taken in scheduling thinning operations to prevent Ips beetle build-up.

c. Thinning Policy and Goals

A thinning prescription should be an integral part of an overall prescription for a stand; this assumes some basic management objectives are clearly defined, and a sequence of treatments have been thought out. Some goal and policy statements follow:

(1). Generally, seral species will be favored as crop trees, but not to the extent that exclusion of climax species results.

(2). Vigorous, well formed trees of any species generally will not be cut if they will be of a merchantable size by the next commercial entry. Maximum cut diameters will be determined by site potential, actual tree growth, current utilization standards, and likely entry period. Stands requiring a



Mountain pine beetle attacking lodgepole pine in a dense stand.

maximum cut diameter above 6" DBH to accomplish prescriptive goals should be considered for commercial thinnings.

(3). Maximum cut diameter for mistletoe infected trees will be variable, allowing for the removal of all infested stems unmerchantable in the last commercial entry. This may not be necessary if the infected host is a minor component of the stand.

(4). All unmerchantable sized trees severely damaged by previous logging, fire, insects, porcupines, rots or elements will be felled if both the following criteria are met:

(a) they have no potential to produce a 16' log,

(b) their removal would release an acceptable crop tree.

(5). The potential to aggravate a Ips beetle problem should be considered, especially where ponderosa pine predominates. Scheduling of treatments should carefully consider the effects of build-up of pine engraver beetles (Ips pini) in thinning slash. All beetle infested crowns, must be felled and bucked into three-foot lengths to prevent further beetle development.

(6). Any prescribed spacing should be considered an average, with tree quality being a primary consideration. Trees along openings greater than 30 feet wide or small groups of trees in large openings should be spaced 30-50% closer than the specified distance.

(7). Contractors will be responsible for selecting crop trees at the specified spacings. Quality control will not be after the fact, but ongoing while work is in progress. Formalized plots may be used to assess quality levels, but should not be substituted for on-site quality inspectors who work with the contractor.

(8). Care should be taken to recognize stands with several distinct age classes. Thinning prescriptions must be designed so as to not deplete any one age class through cutting.

d. Funding

(1). Purchaser TSI Payments - Nearly all timber sales will have a certain amount of timber stand improvement work scheduled as a follow-up to the logging operation. The cost of such follow-up work is appraised as a logging cost, and borne by the seller and charged at a given rate per thousand board feet of green sawlogs. Payments are made based on green volume scaled during each month. These payments are deposited in a Tribal account and should be used for the purpose for which they were collected.

(2). Ten Percent Administrative Fees - A portion of these funds may be budgeted on a fiscal year basis for timber stand improvement work. Funds of this nature are dependent on the Government's ten percent admininstrative fee, and as such, are tied directly to stumpage income. The funds may be used on any Tribal lands for properly budgeted forestry purposes.

(3). Forest Development Add-On - Now that the large reforestation backlog is considerably reduced, more monies will be allocated to thinning operations in the 1982-1991 planning period. Legitimate projects include operations in vigorous precommercial stands or follow-up to commercial thinnings. Add-on funding for Timber Stand Improvement work generally will be placed in Forest Development contracts with the Tribes, and in turn subcontracted out by the Tribes to local Tribal members.

(4). Other - Additional means of accomplishing timber stand improvement work include Federal cost share programs through ASCS offices, Job Corps projects, small scale projects accomplished by fire crews while on standby and occasionally Federal Public Work Programs.

e. Method of Thinning

(1). Contract - It is estimated that several hundred individual Tribal members have worked as contract thinners on the Reservation. The Tribal Forest Management Enterprise has developed a standard operating procedure for advertising, selling, and administering thinning contracts. Competition for thinning contracts has been keen, resulting in low costs per acre. Contracting serves as a prime source of employment and income to many Tribal members, and will continue to be the principle method of accomplishing thinning work.

(2). Forest Development Crew - A force

account crew may be effective on isolated projects. Because the price of flexibility is often high, projects which can be contracted should be.

f. Thinning Slash Considerations

Slash treatment is expensive, increasing the average TSI cost from 50 to 100 percent. Further, such treatment does not increase yields from the site. Thus, the reasons for slash treatment on any given area should be defined. Some reasons follow:

1) Treatment will give needed site-preparation.
2) Wildlife or range management objectives require treatment.
3) Total fuel loading, slope and other factors identify a potentially hazardous situation that cannot be addressed through the use of fuel breaks or other techniques. (Refer to Fuels Management IV.B.3.c. page 130.)
4) Aesthetic: On designed system roads thinning slash will be treated along the road one site distance from the road but not exceeding 100' from the road.

Treatments may be developed to localized areas for maximum effect; such areas include buffer areas along main roads or fuels breaks. Every effort should be made to facilitate and encourage the use of thinning slash. Slash treatment options include:

1) Mechanical piling (limited to 40% slopes)
2) Trampling (limited to 25% slopes)
3) Lopping
4) Bucking with or without spot piling
5) Chipping and/or utilization (along roads)
6) Spring burning
7) Hand piling.

g. Coordination for Proposed TSI Projects

As TSI projects are but one segment of an overall prescription, close cooperation with other sections and branches will be a necessity. Considerations are as follows:

(1). Presales - Presales, in the timber sale planning process, will identify with forest development potential project areas and funding methods in the Forest Officer's Report. Presales will document in the environmental assessment specific mitigation measures for forest development activities in order to achieve multiple use objectives for the sale area.

(2). Timber Sales - All contractual obligations must be met, and TSI activities so coordinated as to not interfer with purchaser operations. Where possible, logging slash treatments should be deferred in TSI Project areas, with monies collected from the purchaser and applied against the TSI Project. A simplified record-keeping procedure has been initiated that allows accountability for money transferred from the purchaser to the subcontractor, usually the Tribal Forest Management Enterprise.

(3). Fire Management - Forest Development will provide fire management with periodic updates on areas treated, and mutually will consider special slash treatments where appropriate.

(4). Wildlife - The TSI forester will provide wildlife personnel a base map delineating project areas. Wildlife personnel will delineate big game cover and foraging areas on the base map and formulate broad treatment recommendations and specific concerns for the treatment area. Following this, wildlife and TSI personnel will meet to discuss and finalize specific treatment objectives and recommendations, after which layout will begin.

3. Dwarf Mistletoe Control

Dwarf mistletoe (*Arceuthobium*, spp.) is the most serious disease problem on the Flathead Reservation. Mistletoe is a seed-bearing, parasitic organism that causes major growth losses and some mortality to their host tree species; Douglas-fir, western larch, and lodgepole pine. The tree's photosynthates are used by the parasite, causing growth losses of 50 percent or more in heavily infected trees. Growth losses have been measured as high as 80 percent. Mortality is common with seedlings and saplings.

Over one-third of the Douglas-fir, western larch, and lodgepole pine stands on the Reservation are infected to some degree with mistletoe. Mistletoe is controlled or suppressed by removal of infected hosts through the normal forest management practices of harvest cutting and thinning.

The present five-year mistletoe action plan (1981-1986) calls the treatment of 4,000 acres annually.

a. Selection of Areas - In the process of conducting pre-sale timber cruises, each cruise plot is assigned a mistletoe rating. The resultant information is summarized in the form of a mistletoe map, with intensity levels broken into three categories: none, light - up to 33 percent of the stand infected, and heavy - where more than 33 percent of the stand is infected. Heavily infected stands will be managed under an even-aged system. Generally, an attempt will be made to reduce mistletoe to a manageable level on all acres rated as being lightly infected. These acres will be scheduled for a complete removal of the infected merchantable component of the stand (as described under silvicultural prescriptions) and a follow-up sanitation of the unmerchantable component. Uninfected crop trees generally will be selected and properly spaced in accordance with thinning guidelines.

b. Stand Condition Criteria - Mistletoe control work will be performed primarily as a follow-up to a harvest cut. The Flathead Silvicultural Prescriptions are designed to treat the infected merchantable portion of the stands. The prescriptions define four infection condition classes, which are listed below together with the follow-up treatment procedures.

    (1). Class I Overstory - more than 33 percent infected.
    Understory - more than 33 percent infected or absent.
    Where infected overstory is removed in a shelterwood, seed tree, or clearcut, any remaining understory will be destroyed by the timber sale purchaser and steps taken by Forest Development to insure regeneration of the stand. Where the infected overstory is partially cut, for aesthetic or other reasons, no follow-up treatment will be scheduled.

    (2). Class II Overstory - more than 33 percent infected.
    Understory - less than 33 percent infected. The infected merchantable portion

of the stand will be removed in the harvest cut and the infected merchantable component will be scheduled for sanitation thinning.

(3). Class III Overstory - less than 33 percent infected.
Understory - more than 33 percent infected or absent The infected merchantable trees will be removed and the infected understory destroyed through skidding and follow up work. Reforestation work will be scheduled where needed.

(4). Class IV Overstory - less than 33 percent infected.
Understory - less than 33 percent infected. All stands that fit this class will be considered for mistletoe follow up.

c. Funding - Three sources of funding are available to accomplish mistletoe control work. Federal Pest Control funds are the primary source with other sources being funds budgeted through the Tribal Enterprise and Purchaser TSI payments.

Federal Pest Control funds are obtained by submitting a project proposal (USDA Forest Service Form 5200-10) to the Area Office. A complete description of the project must be included and contain a cost-benefit analysis, adverse effects evaluation, and control techniques. An evaluation of the proposed project will then be made by the Forest Service; if they recommend the project as being biologically and economically sound, it will be approved by the Regional Forester and forwarded to the Washington Office. The Secretary of Agriculture is responsible for administering the Forest Pest Control Act of 1947, which authorizes Forest Pest Control funds. The Chief of the Forest Service has authority to approve projects. If approved, control funds are transferred by the Secretary of Agriculture directly to the Department of the Interior, and then channeled down to the Agency.

Funds from the Tribal Forest Management Enterprise budget and from Purchaser TSI payments are also used to control mistletoe in the process of accomplishing normal timber stand improvement projects. These funds may also be used for follow-up work in mistletoe areas that have been left. Such follow-up may consist of destroying an infected understory, site preparation, reforestation, or in-planting to accomplish species conversion to non-host species. Areas requiring this type of work will be reported to the Forest Development Section by the District Foresters as outlined in the Reforestation Section of this plan, IV. A.6.

d. Contracting Federal Pest Control Funds to the Tribal Foresty Management Enterprise - The standard procedure for utilizing Federal Pest Control funds will be to negotiate, pursuant to 41 U.S.C. 252 (c) (15), 25 U.S.C., 47 and 16 U.S.C. 594, a contract with the Tribes for mistletoe control thinning work on logging units specified in the five-year action plan. The contract will list representations, certifications, acknowledgements, general provisions, firm fixed price and estimated acreage to be treated, contingent upon the availability of funds.

e. Method of Accomplishing Mistletoe Control Work - The Forest Development Crew and contract thinners will be the primary forces utilized in accomplishing mistletoe control work. The section on thinning in this plan describes the Enterprise's procedure for contracting and contract specifications. The Forest Development Crew will be scheduled to handle follow-up work where special considerations or situations demand responsive management flexibility.

Slash treatment considerations are the same as listed earlier in the section on thinning.

4. Forest Insect Detection and Control

Forests of the Reservation are damaged by a variety of pests including bark beetles, defoliators, and boring insects. The most visible losses are from bark beetles which generally cause direct tree mortality. The Mountain Pine beetle (*Dendroctonous ponderosa*) and Spruce Beetle (*Dendroctonous rufipennis*) have been major problems in the recent past, and will continue to be so until stagnated old growth stands where Engelmann spruce and lodgepole pine predominate are harvested. A number of other bark beetles have caused significant mortality in localized areas. The western pine beetle (*Dendroctonus brevicomis*) yearly kills weakened high valued ponderosa pine over a large area. As stands are brought under management, problems with bark beetles can be expected to lessen.

The effects of silvicultural treatments on limiting defoliating and boring insects will likely be less predictable, although this will vary by insect species, management system, and major tree species.

These insects are always present in endemic populations, and because of natural or man-caused conditions may erupt into epidemic proportions. Prevention through sound forest management practices, as described in other sections of this plan will be the first line of defense against insect outbreaks. Because outbreaks will occur uninfluenced by man's actions, early discovery and reporting are essential. Forest Development files and maps indicate the extent and severity of past insect problems on the Reservation.

a. Forest Insect Detection

(1) Local Surveillance - The most important detection system is day-to-day field observations made by Forestry personnel in connection with their regular assignments. Prompt reporting of insect activity to the Forest Development Officer will insure early evaluation of the situation.

(2) Annual Detection Survey - U.S.F.S. - On an annual basis, generally during August or September, trained personnel from the U.S. Forest Service Division of State and Private Forestry, make an aerial survey of insect conditions on the Reservation. During this survey they map all defoliator activity and the degree of defoilation. All bark beetle activity by species and number of infested trees is also recorded and mapped. This map is then forwarded to the Flathead Agency where ground checks are scheduled for those areas that appear to have more than a normal amount of insect activity.

b. Forest Insect Evaluation - All insect outbreaks deemed potentially destructive which occur on Indian lands, are to be biologically evaluated by U.S. Forest Service entomologists. If State or private lands are involved, the State Foresters Office will be notified. A biological evaluation will appraise the current and potential significance of the outbreak. It will determine the likely course the outbreak will take if no action is taken, the damage or loss that might be incurred and what measures are available to control the outbreak.

c. Forest Insect Control - Bark Beetles

(1) Cultural - The best defense stategy against epidemic beetle popluations is to

maintain vigorous stands of timber. There is much evidence pointing to the predisposition of trees to attack as a result of stress. Stress is an accumlative item arising from physical factors, such as soil and climate, and stand factors such as overstocking. When populations do begin to exceed endemic levels, direct control may be effective in controlling populations of bark beetles.

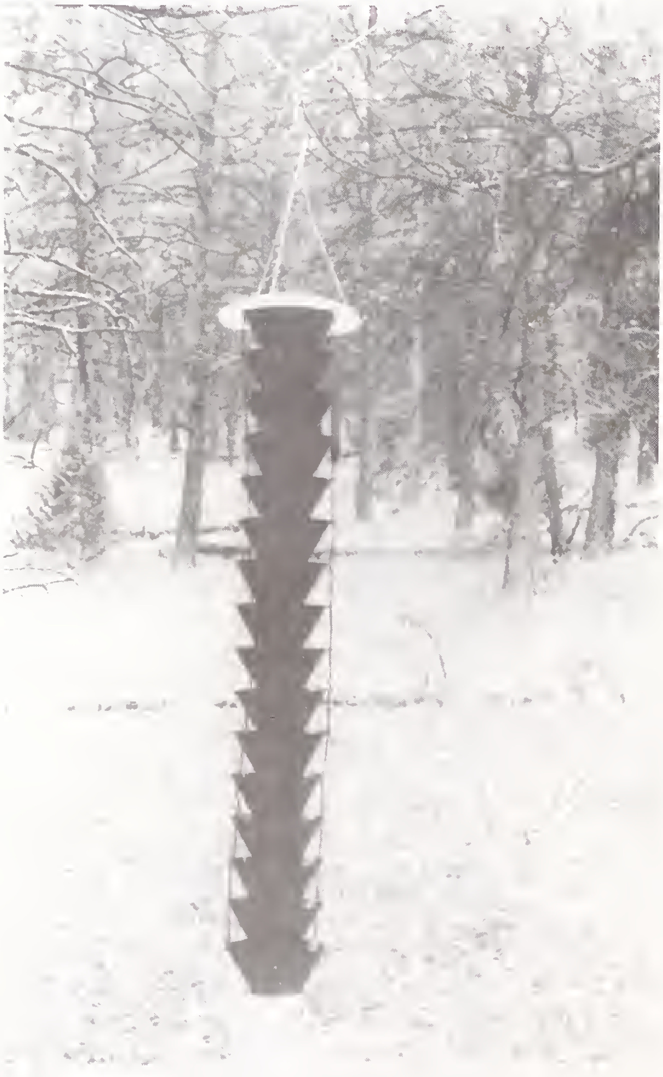
A program of direct control would call for harvesting all infested trees. Timing is the key to success in reducing beetle populations. Infested trees must be removed from the woods before beetle emergence. Direct control (treatment of infested trees only) is at best a stop-gap measure and repeated need for its use indicates the dire need for silvicultural treatment of the stands in question. A decision to implement direct control measures should consider the value of the stands to be protected, probable results in the absence of control, cost of efforts, and the context of the population dynamics (localized infestation versus probable mass immigration).

(2). Mechanical - Various burning techniques are effective in controlling bark beetle outbreaks. Burning of piled, infested slash effectively reduces engraver beetle populations. Other bark beetle populations can be reduced by felling, bucking, hand piling, and burning infested trees where salvage is not possible. Another method of reducing beetle populations involves utilizing trap trees, logs, or poles, and either burning or removing them from the woods before beetle emergence. Mechanical chippers may be used on small-sized infested material. Chips quickly dry out when scattered and broods are prevented from developing. Timing is of utmost importance.

(3). Biological - Biological control of bark beetles is actively being developed.

The use of pheromones is becoming practical for these pests. An aggregate pheremone for use with Mountain Pine Beetle, *Dendroctonus ponderosae* is being developed. As of yet much literature remains unpublished on this topic.

(4). Chemical - Suppression of insect outbreaks by chemical means is a complex undertaking and should be considered only if no other control method is appropriate. Painstaking preparations are required to insure safe, effective application. Planning phases generally require months, even though execution may only take a few days.



Phermone trap for bark beetles.

Aerial spray projects will generally be managed by professionals from the U.S.

Forest Service. Ground applications will usually be under their technical direction but managed by local personnel. Should the use of chemicals be deemed necessary to control a forest insect outbreak, an assessment of the impact of the environment would have to be prepared in accordance with the National Environmental Policy Act of 1969 (PL 91-190).

d. Forest Insect Control-Other Insects
Chewing, sucking and mining insects (defoliators) also cause substantial damage to Reservation lands. Spruce budworm (*Choristoneura occidentalis*), a chewing insect, causes a large but undisclosed loss to Reservation forests in the form of growth, outright mortality of regeneration and young trees, and reduction of natural seeding success. The Larch Casebearer (*Coleophora laricella*), a needle minor, sometimes makes spectacular displays, but is not a major problem. A number of other defoilators occasionally cause localized damage such as the pine butterfly (*Neophasia menapia*), larch sawfly (*Pristiphora erichsonii*) and others. Currently, little more is done than monitor the presence of these pests on a yearly basis. A number of chemical and biological controls do exist. However, presently it is the wish of the landowner not to use these control methods.

5. Forest Disease Detection and Control
Most of the major diseases common to the Inland Northwest are found on the Reservation and include various fungi causing stem, branch or needle deformation and death, root rots, and stem and butt decays.

Detection of the common stem rusts is easily accomplished on the ground; moderate to severe foliar diseases can be mapped aerially.

a. Stem, Branch, Needle Fungi
Recommendations for management of the common stem diseases is generally aimed at reducing the disease rather than preventing new infections. This is accomplished through removal of infected trees during harvest of precommercial thinnings. Needle disease fungi vary in virulence from year to year according to climatic conditions; sustained heavy infections then are rare. Mortality seldom is a problem, but an undetermined growth loss does occur.

Individual tree resistance to some of these fungi is evident. Examples are with western gall rust (Endocronartium harknessii) and white pine blister rust (Cronartium ribicola). The presence of genetic tree resistance provides the forest manager with additional opportunities to minimize effects of tree diseases.

Spruce budworm can destroy a major portion of an annual cone crop.

b. Root Rots and Decays

Both regionally and locally there has been increased awareness of root rots and associated decays. Armillaria mellea has been most frequently detected, and appears to be wide spread. Evidence suggests that partial cutting in root rot infection areas accelerates the pathogen's spread (Dubreuil et al., 1981 and USFS 1982b). If this proves to be correct, more even-aged prescriptions may be required.

Preliminary recommendations for armillaria as an example, call for replacement of more susceptible hosts such as Douglas-fir with a less susceptible species such as western larch.

The various root rots, decays and staining organisms form an interactive complex that is not well understood. Consequently, recommendations are general and at best tentative. Because of this, emphasis in the next ten years will be upon salvage of mortality and continued assessment of long term study projects designed to answer critical management questions.

6. Reforestation
   a. Seedling Production - Tree seedlings are grown at the Forestry Warehouse Complex in Ronan.

Cones are collected from Reservaton lands by private collectors, or, occasionally by Forest Development crew members. Cone lots are identified by the areas and habitat type from which they are collected. These areas are located by Forestation personnel and marked so individuals can locate and collect from them. Each lot is assigned a number to identify its species, area of collection, habitat type, year of collection and germination percent. Frozen storage facilities are maintained in the warehouse.

Rose Mary Thomas collecting lodgepole pine cones.

Seedling reproduction is accomplished in two electrically operated Canadian Branc, double poly 27' x 96' greenhouses. Each house is capable of producing 200,000 tree seedlings per crop, with two crops per year. Seedlings are produced for use on the Reservation, as well as industry and Federal Agencies. Shadehouse facilities capable of holding 400,000 seedlings are located at the Forestry Complex.

Tree seedlings are grown in a peat and vermiculite media in Ray Leach cells and trays. These further compliment the systems approach to reforestation in that they allow the trees grown for each block to be moved to that block prior to planting and maintained at field capacity for moisture.

b. Regeneration Methods - The majority of reforestation projects created by logging or wildfire are accomplished by hand planting, at 300 seedlings per acre. The systems approach, discussed earlier, is continued in that a Dibble Planting Tool, manufactured to form a planting hole of the dimensions of the containerized seedling's root wad, is used. This allows the roots to be placed in contact with the soil, with little chance of a damaging air pocket to be formed. The planting load has been approximately 800 acres annually, dependent on logging activity.

Roughly 150 acres are reforested through direct seeding annually. This is accomplished via helicopter, with a seeding attachment, or with a hand seeder operated from a snowmobile. With fresh, well prepared sites, this has proved to be a very inexpensive, relatively reliable method of reforestation. Direct seeding gives the opportunity to reforest lodgepole pine management areas at 1200 seedlings per acre at a considerably cheaper rate than can be accomplished by planting. Generally, helicopeter seeding has proven to be most cost effective unless project sites are very small and widely scattered. Seeding is done on a snow pack of at least 12 inches in late February or early March with unstratified seed at a rate to allow for the stocking desired. It has been used on timber management (300-500 seedlings per acre) sites equally as effectively.

A third reforestation method is natural regeneration coupled with tractor scarification. This must be accomplished in conjunction with a good seed crop.

Reforestation Technician Sherry Whiting cleaning tree seed.

c. Stocking Surveys - Normally a planted cutting unit is surveyed for stocking two growing seasons after planting. The block however is not certified as established until reforestation personnel are satisfied that minimum stocking levels are achieved with thrifty, well established desired species.

Natural regeneration blocks are normally surveyed two seedfalls after site preparation has occurred.

All planted and seeded blocks receive an initial survival check one growing season after planting. The purpose of this examination is two-fold: 1) To allow for quick adjustments in case of plantation failure. 2) To provide correlation of planting quality to survival.

Even-aged blocks are delineated as either timber management (sawlogs) or lodgepole management (post and pole material). The stocking level for timber management is considered optimal at 300-500 seedlings per acre, while the optional lodgepole stocking level is considered 1000-2000 seedlings per acre.

Containerized western larch seedlings.

d. Electronic Data Processing - Storage and retrieval of even-aged treatment data. In 1977 a computer terminal with visual display and printing capabilities was added to the Branch of Forestry. The terminal is linked to computing facilities at Washington State University in Pullman. This gives reforestation personnel a method of storing, updating and retrieving data for planning on the more than 1200 even-aged treatment blocks already existing, plus those to be added in the future.

Data to be stored on the terminal is made available by the person writing the even-aged prescription for each block in the form of a TREATMENT CARD and FIELD HEADING SHEET. On these are entered field data which is then transferred into the computer. The Treatment Card is filed in the Forest Development Section for future reference and Presale planning.

See Appendix F for routing of treatment cards.

All even-aged cutting unit data is stored and updated on the terminal. Existing software allows for powerful sort capabilities and the ability to easily track the status of any block through time.

Presently, plans are being formulated so to track all cutting prescriptions. Detailed procedures and policy can be found in the Forest Development Survey and ADP Handbook. The storage and tracking of computerized data represents a portion of the systems approach allows a clearcut block to be identified by its habitat type. Seed of a given species, by habitat type, is collected or drawn from existing supplies maintained by Forest Development and grown specifically for that block.

7. Site Preparation - Site preparation is accomplished primarily by mechanical means and through prescribed burning. Presently, three Bureau owned crawler tractors are available for site preparation work. The method of preparation is determined by several factors including soil thickness, soil compaction potential and erodibility, percent slope, fuel loadings, habitat type, cutting block layout, and size, burning window and total Agency burning load for any given year.

   a. Selection of Treatment Areas - In 1981, it was estimated that over 15,000 acres of site rehabilitation exist on the Reservation. These acres are characterized by low merchantable volumes, undesirable understories or a lack of an understory. In most cases site preparation is needed following salvage of low volumes and prior to reforestation. A second category involves site preparation subsequent to the harvest of lodgepole pine. Other projects include scarification on plantation failure sites and preparation of blocks for burning.

   b. Selection Criteria - Areas will be selected for treatment based upon four criteria:

(1). Site Potential. All other things equal, the most productive sites should be treated first. Habitat types that include such plants as pinegrass or sedges may present the greatest need for severe site scarification.

(2). Slope. Slopes less than 40 percent will be treated first with a lower priority for slopes over 40 percent.

(3). Cone Crop Timing. Areas with an eminent cone crop of the desired species should be prioritized for treatments.

(4). Administrative. Schedules developed to minimize machine movements and costs, personnel committments, budgets, and time-frames may be important considerations in the selection of individual areas.

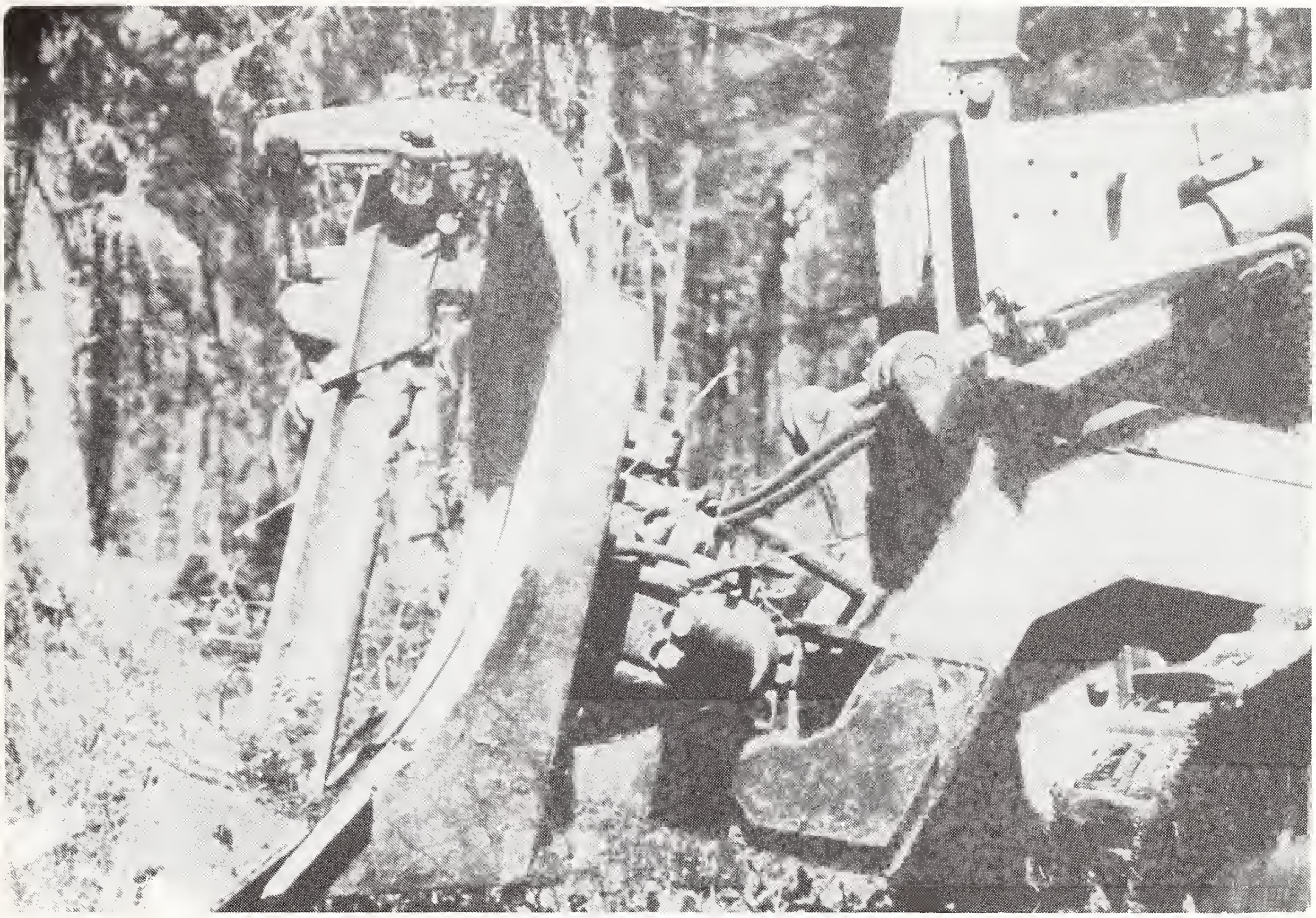
c. Site Preparation Alternatives

(1). Mechanical. The use of scarifying equipment attached to tractors is generally acceptable and effective on slopes under 40%. A need exists to develop effective mechanical means on slopes from 40 to 60%. Mechanical scalpers are being developed to work on such slopes and show promise if slash loads are low and soils well developed.

Forest Development and the Missoula Equipment Development Center have cooperated on mechanical methods to treat intermediate slopes of 40 to 55 percent. A tractor with mechanical scalpers may be effective on these slopes if slash loads are low and soils well developed. Mechanical site preparation will not be used on soils susceptible to compaction. See Section III.H.3. for more information regarding soil compaction.

(2). Cable scarification. This technique is effective, but at present very costly, and in the developmental stages.

(3). Hand scalp. This method provides variable success with planting. Some sites are physically impossible to scalp, making timely reforestation expensive and/or prohibitive.



Scalpers mounted on a tractor blade.

(4). Chemical treatment (spot). This method is proving to be a cost effective means of site preparation under specific circumstances. Presently, a number of chemicals have been demonstrated effective and safe on the common shrub and herb competitors. Problems of contamination can be nearly elminated with proper handling of chemicals.

(5). Chemical treatment (aerial). Broadcast applications may be the most cost effective site preparation technique available. Rigid application controls may substantially raise per acre treatment costs. Potential contamination of non-targeted objects is considerably higher than spot application.

(6). Fire. Prescribed burning provides a biologically sound and cost effective means of site preparation, and will be used increasingly within the next ten year planning period. Increased use of fire is expected to provide data on cost, ecologic and climatic factors that provide for the optimum prescription on various sites.

(7). No treatment. Depending upon plant succession, planting success generally will be low, resulting in prolonged stand establishment and reduced yields. Seeding success of most desireable species will be poor to nil.

A single approach will not suffice. The timely replacement of timber stands requires the freedom to utilize a variety of approaches. Currently, the spot application of herbicides rank as one of the few viable site preparation methods on steep terrain with low fuel loads and severe brush or grass competition.

d. Funding

(1). Forest Development Add-On
Historically a large proportion of site preparation has been accomplished through these dollars. Future emphasis should be to channel add-on funding to rehabilitation sites where minimal merchantable volumes preclude the collection of site preparation monies from any stumpage off that site.

(2). Tribal - Purchaser TSI payments and the Tribal Enterprise budget may fund site preparation needs. Completion of the projected 15,000 acres of site preparation backlog will necessitate greater Tribal funding in the future.

8. Tree Improvement -

a. Purpose - The purpose of any tree improvement program is to mass-produce genetically improved reproductive materials for commercial use. Historical evidence from the southeastern U.S. and worldwide demonstrate the economic feasibility of tree improvement projects. Some specific goals include:

1) Increased tree growth and survival through defined altitudinal and geographic seed transfer zones.
2) Increased growth through tree selection and breeding.
3) Increased growth from utilization of select non-local seed sources.

4) Improved quality for specific products.
5) Development of specific strains for problem areas.

b. History - The Flathead Reservation's involvement in tree improvement began in 1971 with the selection of two superior ponderosa pine stands. Since then, a western larch (1981) and lodgepole pine (1980) progeny test plantation have been planted, and a commercial seed orchard is being planned. The maximum expected gain in volume from tree improvement activities in the Inland Empire is yet unknown. However, our commerical species generally display genetic variation sufficient to capitalize upon. It has been conservatively estimated that volume gains for most species might be as follows: 1) phenotypic selection in the wild 2-4 percent, 2) additional gains from projeny testing 4-12 percent, 3) additional gains from controlled crosses 4-8 percent. Recent seven-year height measurement on ponderosa pine progeny test sites show superior parent trees with progeny displaying 70 percent height gain over average offspring for the same stand. The Flathead Reservation's primary emphasis in tree improvement will be initially directed towards three species: ponderosa pine, western larch, and lodgepole pine. All three species provide seral non-host alternatives for reforestation in Class I mistletoe stands or on other rehabilitation sites. Larch and lodgepole pine will be utilized to reforest portions of the lodgepole pine component and permanent even-aged stands in the apline fire series. As the need arises, other species may be added.

c. Tree Improvement Cooperative - Pursuit of tree improvement activities is too costly for most organizations individually. For this reason, the Bureau and Tribes are members of the Inland Empire Tree Improvement Cooperative, an affiliate of the Western Forestry and Conservation Association. A Memorandum of Understanding was made between the private, state and federal cooperators to facilitate the exchange of information, ideas, and scientific data for the purpose of providing genetically improved forest trees, seed, and other plant materials.

Each species undertaken by the Cooperative has its own committee of participating members that direct the specific activities for that species. Yearly assessments are based upon commercial acreage. Special costs are proportioned according to a cost sharing formula and benefits from the cooperative in terms of reproductive materials will be shared upon the basis of a benefit sharing formula derived by the members of the cooperative.

Measuring tree height in lodgepole pine projeny test plantation.

d. Tree Improvement Schedule - Past activities have included stand selection, collection of seed from phenotypically superior trees within these stands, growing in the greenhouse and the planting of half-sib progeny - provenance test areas over the ecological range of each species.

Preliminary testing has indicated some broad patterns of genetic variation peculiar to each species. Guidelines for limiting seed transfer must be consistent with these patterns of variation. The established test areas for each species will refine preliminary guidelines as well as indicate individuals of superior growth. With the exception of ponderosa pine, progeny test areas have been recently established. They must now be maintained, and measured periodically. Other emphasis in the next ten years will be on first generation seed orchard development.

Future cooperative efforts will likely include development of second and third generation seed and breeding orchards, further collections and testing, and a variety of genetic research necessary to fully capitalize on tree improvement.

A detailed tree improvement plan for the Flathead Reservation is being developed. It will include the following: proposed seed needs by species with assumptions, strategies for each species, detailed cost/benefit calculations, record keeping procedures, detailed schedule of events for the next ten years, and other supportive material.

9. Other Cooperative Actions
   a. Fertilization - The Flathead Reservation's Forestry Program is a member of the Intermountain Forest Nutrition Cooperative. It's charter is to provide response information for selected species in designated physiographic regions for various stand and site conditions. Based upon results, commercial applications of fertilizers to specific stand types may be proposed during the next management period. Each member of the cooperative contributes to the research council and pays a yearly fee based upon number of physiographic regions its ownership falls into. Since the nature of this cooperative action is investigative, membership may be terminated if forest fertilization proved uneconomical.

   b. Insect and Disease Management - The United States Forest Service, Cooperative Forestry and Pest Management Staff Unit, Missoula, Montana, has responsibility for detection, evaluation, and suppression of insect and disease problems on all federally administered land. Expertise is available on call in the areas of entomology, pathology, pesticide use and vegetative control.

The staff unit's character provides the basis for cooperation on three long term root rot studies. These studies are located on the St. Mary's, Ducharme, and Finley Logging Units.

Forest Development files contain chronological records of correspondence and memorandums of understanding, where appropriate, on all cooperative actions. Further, each study completed or now underway has a complete study plan including location, purpose of study, methods, responsibilities and results if available.

10. Other Studies

Several in-house studies exist. These include: an attempt to establish rooted cuttings of western larch, a seed germination study, a comparison of site preparation methods and their effects on seedling survival, and an outplanting study comparing planting method, season, and species.

Forest Development has in the past and will continue to foster a spirit of cooperation with other agencies and research branches in the area of practical study. Presently the Forestry Sciences Lab (USFS) in Missoula, Montana is investigating the effects of various silvicultural treatments on Spruce Budworm populations.

11. Record Keeping and Reporting

Most periodic reporting will be done on a monthly basis. At the conclusion of each month's activities, the T.F.M.E. secretary compiles a report of all Forest Development projects by area, funding source and method of accomplishment. The report includes man-day distributions, units of accomplishment and project maps.

A second monthly report for each contract displays progress by project for each contract between the Tribal Forest Management Enterprise and Bureau. A monthly report of expenditures is included; this report originates with the enterprise. It is reviewed by the executive secretary of the Tribes, Superintendent, Subordinate C.O.R. and sent to the Area Director. The total expenditure for the month then causes a draw-down against the Tribes letter of credit.

Yearly progress reports also are required. Accomplishments are displayed by project and year-origin of funding.

B. Forest Protection

1. Insect and Disease Control

Forest Development has the primary responsibility to initiate biological reviews of insect and disease problems on the reservation, and to coordinate the biological aspects of subsequent control measures. All Forestry personnel will contribute to detection efforts in the pursuit of regular duties, and should report unusual insect and disease circumstances to Forest Development for evaluation.

For detailed discussions, refer to Section IV.A.3. - for Dwarf Mistletoe, Section IV.A.4. - for Forest Insect Evaluation and Control, and IV.A.5. - for Disease Detection and Control.

2. Trespass

a. Timber

Land ownership patterns, ease of access to timber lands and a timber based economy all contribute to the need for a Timber Trespass Program on all the Flathead Reservation. Within the boundaries of the Reservation there exists five different forest landowners. These are: the Tribes, Indian-owned allotments, individually owned fee land, industry owned fee lands, and State lands. These ownerships are intermingled throughout the Reservation and are frequently accessed by a common road system. Good access combined with a timber based economy assures that there will be logging activity at some time on all ownerships. Logging activity, coupled with multiple ownerships means that logging is bound to take place near an ownership boundary and that some type of timber trespass is always possible.

b. Policy and Scope - Tribal laws, State laws, 53 BIAM 7 with Area Supplements and CFR Title 25 provide guidance on handling timber trespass. However, a comprehensive Timber Trespass Program must go beyond statutes and regulations to be effective. The principle elements of the Timber Trespass Program on the Flathead Reservation shall involve prevention, detection, investigation, and case processing.

(1). Prevention

Trespass prevention is our ultimate goal. Prevention activities will differ depending on the type of trespass involved. Intentional trespass is best prevented through public awareness of what constitutes a trespass and the penalties associated with it. A visible deterent through enforcement of the laws, is effective trespass prevention. Unintentional trespass on the Flathead Reservation is more difficult to prevent in that many of the original survey monuments have been destroyed. Landowners frequently use established fencelines and/or unofficial surveys as the recognized boundary. Problems arise from this practice when it is done where fee land adjoins the Tribal land. For the purposes of timber trespass, only the official boundary is recognized, whether it be established by the original U.S.G.S. survey or re-established by licensed surveyor. According to State law, it is the logger's and/or landowner's responsibility to verify the boundaries of a proposed logging operation. Education, prompt action and close administration of existing activities will be implemented as part of the prevention program. Specific prevention activities shall include:

(a) Keeping all area mills informed of their responsibilities and liabilities in a timber trespass action.

(b) Staying abreast of all logging activities within the exterior boundaries of the Reservation through cooperation with State Forestry and close administration of Bureau and Tribally authorized logging.

(c) Contacting the owners of fee land where logging is taking place to inform them of their responsibility to verify adjoining Tribal property lines.

(d) Regular surveillance of all forested land within the exterior boundaries of the Reservation through routine daily duties of the Bureau staff and Tribal Departments.

(e) Controlled access through the road closure program.

(2). Detection

Detection and prevention activities shall be carried out at the same time. When a suspected trespass is discovered it shall be reported immediately to the Trespass Officer. Time is a critical element in investigating a timber trespass. Delay in reporting to the proper authorities can often make the difference between a successful prosecution and a lost cause.

The Department of State Lands, Forestry Division sends monthly reports listing the hazard reduction permits issued to fee landowners within the exterior boundaries of the Reservation. Hazard reduction permits are required by State Law for any logging activity on fee land. Routine follow-up on these hazard reduction permits is a helpful tool in trespass prevention and one of the major tools in trespass detection.

When it is reported that a permit has been issued to an individual owning fee land adjoining trust land, a form letter will be sent informing the landowner of our policies and his responsibilities regarding timber trespass prevention. The Branch of Forestry will check the boundaries and inform the landowner of our findings and inform him of any potential problems regarding the boundary locations. It will be his responsibility to establish the true line.

(3). Investigation and Processing

Investigation of a timber trespass case begins with the detection program and carries through to the final report. Processing the case through the legal system is largely out of the realm of the forester's duties but the outcome is heavily dependent on his initial investigation and follow-up.

Successful prosecution and collection of damages often depends on the perserverence and dedication of the Trespass Officer. The line of authority for settlement of timber trespass cases runs through the Agency Superintendent up to and including the Commissioner of Indian Affairs and frequently involves the U.S. Justice Department and the U.S. Solicitor's Office. The Branch of Forestry is required to initiate settlement through the federal system. However, the federal system often fails to act due to a number of reasons. The Tribes retain the perogative to pursue settlement in the State Court system but cannot do so until the case is referred to them. The critical point here is that the federal government has six years and 90 days to initiate action while the statute of limitations for State action expires two years from the date the trespass occurred. The Trespass Officer's responsibility is to do a thorough, accurate, and timely investigation and monitor case settlement through the federal system. When it becomes evident that the federal system will not be able to settle the case the Trespass Officer must recommend to the Superintendent that the case be referred back to the Tribes with sufficient time to allow the Tribes to exercise their perogative of settlement within the State court system.

A successful Timber Trespass Prevention Program depends heavily on this last step. If trespassers cannot be successfully prosecuted and damages collected, then the potential trespasser has no deterrent. If no deterrent exists then the Bureau will have a continuing timber trespass problem and subsequently will not be acting in the best interest of the Tribes.

3. Fire Management

a. Policy

Should wildfire occur within the exterior boundaries of the Flathead Reservation, a number of documents dictate the procedure to be followed to contain, control and extinguish the fire. The most important document is 53 Bureau of Indian Affairs Manual Supplement 8, which assigns authority and responsibility for all forest and range fires to the Branch of Forestry's Fire Management Section. Significantly, 53 BIAM 8 states that "Fire suppression should take priority over all other duties, except the protection of human life". This Bureau Policy establishes the necessity for rapid control of all destructive wildfires on the Flathead Reservation and dictates (1) an agressive fire prevention program using, (2) the least expenditure of funds, based on the latest state-of-the-art management decisions employing, (3) suppression methods least damaging to resources and the environment with, (4) the greatest possible cooperation between other federal, state and local fire suppression organizations.

(1). Cooperative Agreements
The Flathead Reservation, Bureau of Indian Affairs Fire Management Section, in conjunction with the United States Forest Service, has written Cooperative Agreements prescribing the procedure for initial attack and overhead by either federal agency on Tribal lands and/or Forest Service land. In addition to protecting Reservation and Forest Service land adjacent to Reservation land, the Bureau of Indian Affairs Fire Management Section also provides primary protection to all lands within the Reservation boundary including: Montana Department of State Lands, Fee lands, Division of Forestry and the Montana Department of Fish, Wildlife and Parks lands, as well as for the National Bison Range, Ninepine and Pablo Refuges, under the jurisdiction of the U.S. Fish and Wildlife Service. One of the most important agreements between the Confederated Salish and Kootenai Tribes and the Bureau outlines both use of Tribal Personnel and reimbursement of Indian people. Several other agreements for cooperation between local volunteer fire departments and the Fire Management Section have been written to reflect the mutual benefits for these various organizations.

(2). Fire Trespass
In the event of wildland fire trespass by public organizations or private citizens, the Bureau of Indian Affairs Fire Management Section assigns a Fire Investigator to determine fault and/or negligence in the incident. A variety of options is then available to collect costs of fire suppression and/or damages from the agencies, organizations or individuals responsible.

Depending upon the circumstances and the amount of damage, the Flathead Agency may first attempt to collect from the responsible parties by notifying and billing them. If these efforts fail to achieve satisfaction, the Flathead Agency may use the State of Montana Fire Laws, usually Section 45-6-102 (Negligent Arson) to collect. Other options for collection of costs and/or damages are available by using the Tribal Court System, the Federal Magistrate, State Justice of the Peace Court, or by filing a civil suit in Federal District Court. The Flathead Agency has been most successful by billing the party or parties directly with reference to the State of Montana Fire Laws.

(3). National Inter-Agency Firefighter Qualifications
Much of the cooperation between other agencies, fire organizations and the Flathead Reservation Fire Management Section can be directly attributed to the use of qualified personnel on all fires. Standard policy is that fires involving personnel from the Flathead Agency are staffed by qualified personnel who meet the classroom training and experience requirements for positions under the National Inter-Agency Firefighter Qualification Standards (N.I.F.Q.S.). The progress of each individual who is active in fire suppression is monitored so that he receives the proper amount of training to ensure his continued qualification as a firefighter.

(4). Normal Fire Year Plan
During the late fall of each year, the Fire Management Officer prepares the Normal Fire Year Plan including a budget. This plan is based on a ten year average of fires on the Flathead Reservation. While developing the Normal Fire Year Plan, the operation of the entire Fire Organization is analyzed. The N.F.Y.P. is divided into seven different categories to reflect cost coding for (1) Permanent Personnel, (2) Seasonal Personnel, (3) Services, (4) Supplies, (5) Overtime and a minimal amount for (6) Aircraft Flight Time. In addition to funding of firefighters and equipment on the Flathead Reservation through the N.F.Y.P. process, the plan justifies air support in the form on one helicopter for the Helitack personnel stationed in Ronan, and a Fixed Wing Retardent Aircraft at the Retardent Base, Glacier International Airport, in Kalispell, Montana. The Area Office may

request and move these aircraft as needed when support for large fires on other Reservations is required. The Area Office may also call for Montana Indian Firefighter Crews (M.I.F.F.) and for Overhead personnel to fight fire on other Reservations and other Agency lands.

(5). Agency Fire Plan

The Agency Fire Plan that is written each spring reflects policy and procedures to effectively utilize regular and emergency fire presuppression and suppression funds for advance planning, maintaining an adequate state of preparedness and executing proper suppression action. The responsibility for initial attack lies with the Fire Management Office in Ronan. Initial attack dispatch capability includes helitack, pumper, organized crews, and a call for retardant aircraft or smoke jumpers. The permanent Bureau Fire Staff presently consists of the Fire Management Officer, the Fuels Officer, Dispatcher, Warehouseman and Electronics Technician. Additional permanent staff provided by the Tribal Forest Management Enterprise consists of a fulltime Secretary and a Helicopter Foreman/Crew Boss who works in the Fire Management Section for aproximatey six months a year.

(6). Seasonal Fire Crew

All seasonal presuppression forces are hired on the basis of the normal fire season. The fire season begins about May 1st, with infrequent fire occurrence through the end of June. From approximately July 1st through August 31st, the fire season is characterized by increases both in occurrence and rate of spread of fire. In normal years, the rate of occurrence of fires begins to diminish after September 1st, as the longer and cooler nights reduce the fire danger. On or about June 1st, approximately twenty people are hired to perform maintenance work and handle early season initial attack. An additional twenty crewmen plus lookouts are hired on or about June 10th and held through the peak of the fire season. The tours of duty for the Fire Technicians and Aids stationed at the Ronan and Hot Springs Districts are staggered to provide seven day coverage including holidays. The Supervisory staff works whenever the fire crews are working.

(7). Overhead

The present Forestry Staff, with its experience and training, is capable of filling most overhead positions in a normal fire situation occurring on the Flathead Reservation. There is an Overhead Class II Team with personnel from both the Lolo National Forest and the Flathead Reservation; but if the need arises, there are enough Flathead N.I.F.Q.S. personnel to make up a Class II Team. The overhead team may be called for large fires on and off the Reservation. Overhead personnel may also be given assignments throughout the Billings Area, Portland Area, Alaska, Canada, and the Western United States. Bureau Foresters and Tribal Technicians will be used for fires on the Reservation beyond the initial attack when needs dictate.

(8). Manpower

Organized Indian crews are available for manpower needs beyond the initial attack stages. Four Montana Indian Firefighter crews are available on the Reservation. Additional M.I.F.F. crews from other Reservations in the Billings Area are available through the U.S.F.S. Regional Fire Coordinator. Requests for Class I (Inter-Regional Hotshot Crews), Class II (Regular Crews), and Smoke Jumpers may also be made through the U.S.F.S. Regional Fire Coordinator. Qualified operators and equipment which meet the Bureau standards are signed up on a Rental Agreement form prior to each fire season.

(9). Supplies

Present capability under the Normal Fire Year Plan is to equip 150 men out of the Ronan Warehouse. A one-hundred man camp is also available for large fires. Fire supplies may also be ordered through the U.S.F.S. Regional Fire Coordinator at the Aerial Fire Depot in Missoula, Montana, or the Boise Inter-Agency Fire Center, Boise, Idaho. Minor repairs on tools and equipment can be made in the Ronan Warehouse.

(10). Engines (Pumpers)
The Ronan Warehouse has available for dispatch three 300 gallon pumpers, two 150 gallon pumpers and one 1,000 gallon tanker. The Hot Springs District Warehouse has one 150 gallon pumper and one 1,000 gallon tanker. A crawler tractor may also be put under contract for immediate dispatch during periods of "High" fire danger.

(11). Aircraft and Communications
Several small fixed-wing aircraft with a minimum of 230 horsepower are used on an as needed basis, under rental agreement. Reconnaissance flights for the detection are made after thunderstorms activity and during periods of extreme fire danger. The helicopter on contract with the Bureau of Indian Affairs is stationed at the Ronan Heliport beginning July 1st. The helicopter will furnish helitack capability through September 15th or until the end of the fire season, if later than September 15th. Additional resources in the form of retardant aircraft and smoke jumpres are available from the U.S.F.S. in Missoula and Kalispell and from the Boise Inter-Agency Fire Center (B.I.F.C.). An electronics technician is stationed at the Ronan Warehouse to provide immediate service for all Agency mobile radios, base stations and repeaters.

(12). Fire Warehouse
An appropriate state of readiness is maintained at all times for the fire warehouse, as well as for all pumpers and engines. The fire warehouse is organized so that the critical path method of management can be used for storage and dispatching tools and equipment. All equipment is to be maintained in excellent condition ready for immediate dispatch. Pumpers and engines are inspected to insure they have been properly maintained and equipped at all times.

(13). Lookouts
Jocko, Pistol Creek, Ferry Basin and Irvine lookouts are manned on a regular basis. The lookout personnel are on a staggered schedule so that coverage of seen area is maintained at all times. The State of Montana provides some lookout

coverage on the western half of the Reservation through operation of Baldy Mountain Lookout, and from Hubbard and Blacktail Mountain Lookouts that lie north of the Flathead Reservation. The lookout fixed detection system is supplemented by aerial reconnaissance patrol flights during periods of high, very high and extreme fire danger.

Air tankers that drop fire retardant are located in Missoula.

b. Suppression
Immediate action to be taken on fires is based upon a number of existing conditions. When the fire danger is low or moderate, the initial attack force will be made up of two to three firefighters and one pumper/engine. An evaluation, taking into account geography, fuels and the weather conditions, will be made immediately to determine if additional suppression people are needed. During periods of high, very high or extreme fire danger, the initial attack force will be made up of from four to twelve suppression crewmen, using several pumper/engines and the contract helicopter. In periods of high to extreme fire danger, the necessity to use

retardant, smoke jumpers and reinforcements will always be analyzed by the Fire Management Officer. The Forest Manager and the Superintendent will be advised of all fires and of the activities to suppress them.

If a fire is complex, comprehensive planning and immediate action must be instigated. The Fire Management Officer will put a Class II Overhead Team on alert or standby. Organized crews in sufficient number, will be ordered with lead time considered as a critical factor. Retardant and retardant aircraft are ordered and aerial reconnaissance of the fire will be maintained. A fire camp and fire equipment for the fire may be ordered through the U.S.F.S. Region 1 Warehouses. All units and organizations with which the Bureau has Cooperative Agreements are put on notice for possible assistance.

Briefings, regarding those fires which have escaped control, are provided for the Class I or Class II Overhead Teams, as well as the Forest Manager and the Agency Superintendent. During these situations, the initial attack capability will be maintained and the fire warehouse will be restocked to prepare for any additional fires.

c. Fuels_Management_Methods_and_Guidelines

(1). Management_Objectives_and_Goals

The main objective for fuels management is to ensure that land management objectives of forest protection and sound silviculture will be accomplished through a fuels management program.

The reference guide for fuels management will be the Flathead Reservation Fuels Management Plan 1982-1986 (hereafter FRFMP).

Based on the main objective stated above, the Fuels Management Program will be directed to accomplishing the following related goals:

(a). To identify fuels in terms of hazard risk, land values, suppression capabilities, ignition probability and human impacts; determine probable fire behavior of available fuels and to identify alternatives to reduce this hazard.

(b). To effectively identify severe hazard areas resulting from precommercial thinning and mistletoe control and provide alternatives of hazard reduction.

(c). To provide current and new fuels management methods and techniques in relation to prescribed burning for achieving objectives of site preparation and providing areas for new forest growth.

(d). To identify and prepare fuel management prescriptions which consider the ecological impacts on soil type, wildlife, fish-bearing streams and long range resource impacts not excluding such impacts as smoke problems in relation to airshed around populated areas.

(2). Effects of Fire and Fuels Management Activities

Fuels management activities will require consideration of the following factors before selection of fuel treatment is made:

(a). Fire potential - past fire occurrence of area, fuel hazards, recorded weather patterns.

(b). Soils - effect of method on soil productivity, structure, physical and chemical properties, erosion.

(c). Water - effect of treatment method on forest water resources in relation to wildlife, fisheries, water quality and yield.

(d). Timber - effect on insect populations, root rots, dwarf mistletoe, damage or enhancement of stem quality.

(e). Wildlife - impact of treatment on wildlife food production, animal movement, and cover.

(f). Utilization - ability to use forest residues.

(g). Tribal religious grounds -

coordination with the Tribal cultural committees and the Tribal Council for approval in areas involved.

(h). Site preparation - ability to achieve the desired results for reforestation.

(i). Air quality - method considers current smoke management controls in relation to timing and treatment method.

(j). Adjoining private and public lands - effect of treatment realized for present and long term influence on land resources and property.

(k). Realistic treatment - fuel treatment must be feasible, realistic, economically sound and safe from potential accidents for personnel involved.

(3). Sale Activity Fuels (Even-aged)
Fuel appraisals to determine downed woody fuel loadings and duff layer percentages will be made on all prescribed burns. The inventory method used will be Downed Woody Fuel Inventories (Brown, 1974) with Duff Inventory Methods suggested by (Ryan, 1981). Fire Management, the Fuels Officer and assigned seasonal personnel will be responsible for completing all pre and post-burn fuel inventories. Inventory intensities data and reference forms can be found in the (FRFMP, 1982). The fuel inventory results and desired burning objectives will be referenced in completing the Burning Prescription. A copy of the Prescribed Burn form can be referenced in the (FRFMP, 1982).

The primary objective for prescribed burning in the even-aged component will be site preparation. Presently most even-aged management acreages with slopes less than 40 percent are dozer piled for site preparation and hazard reduction objectives.

The Bureau of Indian Affairs and Tribal Forestry Management Enterprise is responsible for all prescribed burning practices. Prescribed burning activities will be funded by a (BD) brush disposal collection from the purchaser. This cost will be determined in the sale preparation of any logging unit.

(4). Sale Activity Fuels (Uneven-aged)
The management of forest fuels created by select logging activity raises many

Broadcast burning reduces fire hazard and promotes reforestation (Block 7 Boulder Logging Unit).

questions with land managers. One frequently asked question is, what fuel loadings are acceptable in terms of fire hazard? There are presently large areas of partially cut stands with fuel loading up to 40 tons per acre. For other than silvicultural site preparation objectives, treatment of fuels for hazard reduction involves many factors. It is not presently possible nor economically feasible to treat all acreages involved, nor is it possible to define exactly what acreages require treatment. Therefore, the determination to treat specific areas will be made after the activity is completed. There are a number of steps that will be made on a case by case basis to decide what fuels to treat.

These steps are as follows:

(a). Review the management objectives of the area in relation to the values at risk.

(b). Appraise the fuels by current photo guides GTR-INT 96, 97, 98 (Fischer, 1981) and predict the fire behavior potentials.

(c). Consider adjoining areas fire behavior potential, suppression capabilities, frequency, and history of fire spread.

(d). Determine the fuel treatment alternative that can be accomplished economically and realistically.

Some considerations are:

On slopes greater than 40 percent -

(a). Prescribed burning.

(b). Jackpot burning (modified method of broadcast burning).

(c). Lopping and scattering.

(d). Handpiling along major roadways.

(e). Handpiling the complete area.

On slopes less than 40 percent.

(a). Prescribe burning (if conditions and prescription permit).

(b). Jackpot burning.

(c). Cat trampling.

(d). Cat piling.

Fire Management will have the responsibility of identifying what acres will require treatment within a sale area. Fuel activity projects will be funded by a (BD) brush disposal collection from the purchaser. The collection amount will be determined in the sale preparation of a sale.

Prescribe burning will be the preferred method of fuel treatment, however, accomplishing treatment will be limited due to the short burning seasons and priority requirements on the even-aged units requiring site preparation.

Close coordination will be maintained with the Presales and Timber Sales Sections to address fuel problems before they occur and assist in planning in harvest methods, control line locations, tree skidding methods, etc.

(5). Forest Development Activity Fuels
Past thinning activities on the Flathead Reservation have created heavy accumulations of slash. Presently, where possible, the Forest Development Section employ their cats to dozer pile slash eliminating the fire hazard while achieving their main objective site scarification. Close coordination with the Forest Development Section will be maintained on acreages thinned and slash ledgers and maps will be updated yearly in the Fire Management Section. Guidelines area available in the FRFMP, 1982-1986, which will aid in the decision making process of determining what acreages require hazard reduction treatment. These guidelines reference past fire history, fire potentials in terms of fuel loading, slope, aspect, suppression response time, and relation to high value resource areas, housing developments, etc. The guidelines will also list alternative treatment methods, for example, when commercial thinning is employed, using techniques which minimize fuel buildup, such as tree length skidding, etc. Fuel break construction standards, jackpot burning and other hazard reduction techniques are also discussed.

(6). Natural Fuel Appraisals
Presently natural fuel appraisals on the Flathead Reservation use a combination of

references and methods. Reference to the 1980 CFI-Continuous Forest Inventory (fuel loading data) can be made to determine loadings in areas where CFI plots exist. This fuel loading estimate is considered a general example of what fuels exist due to the sample taken. For more specific fuel predictions relating to high value resource areas, proposed projects, etc., Downed Woody Fuel Inventory (Brown, 1974) plots will be made. The information from these inventories will be displayed on maps to assist in preparing other projects within an area to evaluate impacts on total fuel mosaics. Photo Guides for Appraising Downed Woody Fuels in Montana Forests (Fischer, 1981) are available and are presently being used to show different levels of downed fuel from natural processes in eight forest cover types in Western Montana. These photos are supplemented by inventory data describing the size, weight, and condition of the debris pictured. Subjective evaluations of potential fire behavior under average bad fire weather situations are also given. These technical reports INT-96, 97 and 98 are available at the Fire Management Office in Ronan for reference and field use.

(7). Prescribed Burning

Prescribed burning is defined as the skillful application of fire from a carefully planned prescription for a definite land area to accomplish specific objectives (Martin & Dell, 1978). Presently on the Flathead Reservation prescribed burning is used for a variety of defined objectives, site preparation, species manipulation, hazard reduction, disease and insect control, range improvement, and wildlife habitat. The anticipated benefits of any prescribed burn must be carefully weighed against its potential damages. Therefore, guidelines and minimum standards must be written and followed to ensure a responsible program. These guidelines which include control principles, prescribed burn plans, organization charts, and other important considerations toward prescribed burning are discussed in part II of the FRFMP, 1982-1986.

(8). Mission Mountains Fire Management Plan
Presently a Fire Plan for the Mission Wilderness is being considered and our goal is to have an approved plan in action by 1986. Copies of the proposal are available at the Fire Management Office in Ronan for reference.

(9). Montana Smoke Management
The Smoke Management Memorandum of Agreement, entered into effect by the Billings Area Director, James A. Canan, July 31st, 1978, is the document the Bureau of Indian Affairs has agreed to abide with in the State of Montana. The members of the agreement are dedicated to the preservation of air quality in Montana. All Federal, State and private land management organizations involved in methods of prescribed and other accepted forest burning practices are involved in the agreement. Reference can be made to the Montana Smoke Management Agreement in the FRFMP, 1982-1986 Appendix.

C. Logging Roads
Most forest roads on the Flathead Reservation are currently constructed or reconstructed for the primary purpose of removal of forest products. However, these roads serve not only as logging roads, they also provide access for hunting, fishing, recreation, forest administration, fire control, and other uses. Forest roads are a necessary component of timber harvesting and other forest management activities.

A portion of the present Flathead Reservation road system evolved from road and trail construction during the 1930's and early 1940's under the Civilian Conservation Corps-Indian Department (CCC-ID). Created during the Depression by President Franklin D. Roosevelt, the CCC-ID built or rebuilt and improved many miles of primary access roads up the major drainages and over major ridges. The main justification for these projects was to provide fire protection for the forested areas of the Reservation, but these roads were undoubtably also seen at the time to be useful as access for future timber removal. This fact, no doubt, was used in considering where roads were located and their length. Some of the access roads that were built/rebuilt and have become important main haul routes include: a) Jocko Canyon area: the South Fork of the Jocko, Jocko Lakes, and Pistol Creek Truck Trails and St. Mary's Lake Road; b) West side: Bassoo Creek, Mill Creek, Mill Pocket Creek, and Clear Creek Truck Trails and Camas and Morigeau Gulch Roads; c) South end: the Valley Creek and Magpie

Truck trails and Frenchtown and Vanderburg Roads; and d) North end: truck trails on Elmo Ridge and Irvine (Historical Research Associates, 1977). Fortunately, almost all of these truck trails and roads fit reasonably well with past and current logging activities as access or main haul routes. Past timber sales generally incorporated these access routes and any other old or existing roads/trails into the road system in order to reduce new construction costs.

1. General Policy

   Reservation logging road systems are currently being designed with a minimum of engineering specifications, while allowing for economic log removal and considering environmental consequences. This coincides with past Tribal Council direction and intent. All new roads and reconstructed roads will be seeded with grass as soon as possible following construction to reduce erosion and slow the invasion of weeds.

   a. System Plan

      The basic road system plan used for Flathead Reservation timber sales usually includes one climbing main haul road with a series of parallel or nearly parallel spur roads. A second or third climbing main haul may be used if the area is large or has more than one major drainage in it.

      System planning will attempt to incorporate existing roads in the plan where these roads reasonably fit, and will usually tie into highway routes via any access roads already in place. Plans for future timber sales on second or subsequent entries will incorporate or eliminate existing roads to arrive at a system with desired spur road spacing. Considerations here will include the economics of reconstruction versus new construction, aesthetics, and the Tribes' desire for 1000-foot average road spacing.

   b. Road Standards

      New logging road construction on the Reservation will meet minimum standards that allow economical removal of timber products and limit adverse environmental damages to an acceptable level. Generally speaking this will involve three different standards of roads. See Table IV-1, page 145 for more details on road standards and specifications.

      (a). High Standard

      High standard roads will be the lower

portions of the main haul roads, located in the valley bottoms. These roads will have strict specifications regarding width, grade, turnouts, back slope, ditching, surfacing, culvert placement, and maintenance.

(b). Intermediate Standard

The remainder of main haul routes will fall into the intermediate standard. These main haul portions will generally be within the forested zone with grades generally less than eight percent. They will usually be between one and two lanes in width with turnouts that are not normally intervisible.

(c). Low Standard

The low standard road category will contain all of the remaining roads - a few main hauls and all of the logging spurs. They include most of the forest roads on the Reservation in terms of mileage. These might be designated as "Forester's Roads" as opposed to those that have higher specifications. They are usually built with minimum specifications and only that construction necessary to extract the forest products. These roads are narrow, not back sloped, may be steep in grade, usually not ditched or maintained and generally located to lie as lightly on the land as possible.

While transportation costs are higher on low standard roads, construction and maintenance costs are reduced. Less land area is removed from timber production, and the adverse visual impact of logging roads is lowered substantially.

c. Road Density

The density of logging roads, i.e., the average spacing between the roads, on recent timber sales averages approximately 900 feet slope distance. With an average logging slope of 35 to 40 percent within the forest this converts to a road density of approximately six and one-quarter miles of logging roads per section of timber accessed.

Much of the logging in the past has been done with road systems designed with much closer road spacing; for example, shovel logging as done in the South Jocko area and on the West Side has had road spacing as close as 100 feet or less. Because of this the Reservation now has an average logging road spacing of approximately 600 feet.

During the next ten-year period Reservation timber sales will be designed with road densities averaging five and one-half to six and one-quarter miles of road per section accessed. This will mean average spacing from 900 to 950 feet slope distance. On ground suitable only for jammer (cable type) equipment - slopes greater than 45 percent - road spacing will average 700 feet slope distance. On slopes less than 45 percent, where cat-type tractors and/or rubber-tired skidders can operate reasonably, road spacing will range from 700 to 1300 feet average slope distance as the slope ranges from 45 percent down to flat ground.

As a consequence of the above spacing criteria future design of road systems for timber sales will necessarily be eliminating some old roads in previously logged areas. Old roads will be reused where they fit the spacing planned, but those old roads not required for logging will be eliminated and permanently put to bed, with the approval of the Tribal Council, to return them to productive growing sites.

Contouring logging spur roads.

2. Specific Area Plan and Road Location

Every proposed timber sale that is approved by the Tribal Council for preparation will have a complete road system planned for it. This plan will include both the necessary field reconnaissance and the office preparation of a map and related data for the proposed road system. The system will tie in and be compatible with existing road systems on adjacent areas, if feasible. The planning will involve consideration of existing roads as well as future anticipated needs with regard to logging and other uses. Costs of new road construction will be a primary factor in the planning. Most timber sales proposed now are areas bounded by major topographic features and thus will incorporate one or more watersheds. Generally each watershed will have a road system designed for it and where required these systems will be connected.

The location of roads (from the field reconnaissance) in the office plan will often be restricted to some degree by topographic features. Other critical factors that must be considered when planning road locations are: area size and total relief, slope and logging method, existing roads, road grade, timber base, protection of the water resource, aesthetics, wildlife, soil properties, and special considerations.

a. Topography

Topographic obstacles to roads are frequently found within the forested zone, most often in the form of rock outcroppings, and large rock slides. Roads should be located to avoid these obstacles when possible in order to reduce construction costs.

b. Area Size and Total Relief

The area size and shape, to a certain extent, will help determine the location of the main haul climbing road. The main haul should be located, staying within specifications, so as to minimize its length and construction costs, and also to minimize average transportation time and hauling costs.

The total relief (net elevation difference) has a direct bearing on the number of spur roads necessary to adequately cover the area for logging. This must be considered together with the ground slope and logging method.

c. Logging Method

The timber sale must be divided into areas suitable for cable logging and areas suitable for tractor or rubber-tired equipment, according to the slope and soil conditions. This categorizing will directly affect the road spacing and location within these areas and the sale as a whole. In addition, roads will be located at slope breaks where possible - particularly where cable and cat areas abut. This is necessary to prevent deflection problems with cable logging equipment later on.

d. Existing Roads

The reuse or reconstruction of existing roads will play a large role in planning the location of the entire road system. Providing that other criteria, such as road spacing and road grade, are reasonably satisfied, the inclusion of existing roads within the road plan will be done to keep overall road costs down. This may entail modifying the preferred road location, road grade, and/or road spacing somewhat to produce a better overall road design.

e. Road Grade

The steepness of a road is a critical factor which directly affects soil erosion and log hauling costs. As road grade increases above four percent erosion potential and transportation costs increase very rapidly. The grade of any newly constructed main haul will not exceed eight percent.

Spur roads will follow the contour with two to three percent dips for drainage purposes, except for minor steep pitches to avoid topographic obstacles.

For effective drainage, roads should have a two to three percent favorable grade when approaching a draw, and a similar percent adverse grade when leaving it, for at least 100 feet on each side.

f. Accessing the Commercial Forest

The road system for each new timber sale will be designed to access the entire commercial forest area unless the Inter-disciplinary (I.D.) Team specifically limits new road construction on a sale. The non-commercial forest and non-timbered areas will not be accessed unless required to reach commercial forest land. Access to an isolated commercial stand of timber or site will not be developed if the long-term benefits do not warrant the construction of a logging road.

g. Streams

The location of logging roads will be kept far enough out of a stream's riparian zone to protect the aquatic habitat. When a logging road must cross a stream, it will be located so that the approaches to the stream will be as short as possible while being within the road grade limits. The road design will specify the location and size of each culvert or bridge required. Wildlife Biologists and Fisheries Biologists will be consulted regarding all forest road activities that could affect the fish and wildlife resources. Culverts or bridges will be required on all roads where they cross a perennial stream. All permanent culverts in fish bearing streams should be installed on the grade of the original stream and have resting pools at the inlet and outlet. Culverts should be specified on intermittent streams wherever damage to the road surface or roadbed might occur due to spring runoff. Watershed data, interdisciplinary input, and experience should all be employed in making decisions on the size and type of structure to be used.

h. Wet Areas/Fragile Soils

Fine-textured soils found in stream bottoms, wet areas, and primarily on lower slopes have greater erosion potential than coarse-textured soils.

Highly erodible soils and wet or boggy areas will be avoided when locating roads. New roads on a road system plan will not be located within riparian zones except to cross them.

i. Aesthetics

Logging roads are one of the primary negative impacts of timber sale activity. In sensitive areas aesthetics must be considered in locating and constructing logging roads.

j. Wildlife

Key wildlife habitat and recreation areas will receive special consideration in planning a road system. Prior to the office phase of planning the road system planner will coordinate with the BIA Wildlife Branch and the Tribal Recreation Department to delineate key areas. Compromise on final road location or inclusion of protective measures may be necessary to achieve the best road system design while protecting key areas. See section III.F.5.f. for a discussion of road management and wildlife.

k. Special Conditions

Certain timber sales may have unique features such as cultural resources or areas of Tribal religious significance which may require adjustments in the planned location of the logging road system.

3. Road Layout and Construction

a. Road Layout

On each timber sale the centerlines of all new logging roads will be flagged in the field, based upon the prepared road system plan for the sale. This layout will be approved by the Forest Officer-in-charge, prior to any right-of-way timber felling or road construction.

The field layout of new main haul roads is critical to proper location of the complete road system. Therefore, new main haul roads will be laid out first. Thus, if necessary, each main haul location may be adjusted in the field layout to conform to actual site conditions and access requirements. Once the layout of main haul roads is done and approved then spur road layout may commence. The Roads Forester and/or his assistant will perform the field layout of new main haul roads.

b. Road Construction

Specifications for new road construction are show in Table IV-1.

(1). Alignment

Road alignment is a function of curve radius and curve frequency. Poor logging road alignment limits vehicle speed and may limit vehicle use as well. If improved alignment is desired it can also be one of the most important elements in road construction costs. Improved alignment usually results in larger cuts and fills, longer sight distances, and faster vehicle travel.

On the Flathead Reservation, improved road alignment will generally be a minor consideration on low and intermediate standard roads, providing the road layout and construction does not prevent or seriously impede log truck use.

Realignment of high standard main haul roads will be done if sight distance, safety, or vehicle speed can be substantially improved without large increases in construction costs.

(2). Right-of-Way Clearing
Clearing of right-of-way for logging roads will not exceed that necessary to allow un-encumbered construction of the road, normally a maximum of one-half chain (33 feet) in width. The clearing width will

Table IV-1. Road Standards - New Construction Specifications

	High	Intermediate	Low
Ordinary Width (ft)	16	14	12
Preferred Maximum Sustained Grade (%)	4	6	8
Ordinary Maximum Grade (%)	5	8	10
Absolute Maximum Grade-Pitches (%)	8	13	18
Maximum Sustained Grade (length-ft)	-	500	1000
Minimum Curve Radius (ft)	100	75	65
Surface 1/	Graded & Drained	Graded & 2/ Drained	Graded 2/
Ditching 1/	Required	Recommended	If needed
Turnouts	Usually intervisible	Usually Not intervisible	Occasional - at least one/1/4 mile
Turn around	-	-	End of each road.
Maintenance 1/	Critical	Required	Required if road left open. Not required if road closed.

1/ Maintenance, ditching, and surface (drainage) standards are dependent on adequate funding being available for proper maintenance.

2/ Drainge will be provided through the use of rolling dips where ditches and culverts are not installed.

be designated by the Forest Officer-in-Charge. Clearing will be complete within the road prism itself following construction.

(3). Culverts/Bridges
Permanent corrugated metal pipe culverts will be installed, or bridges built, on logging roads at all stream crossings specified in the road plan, unless determined to be unnecessary during the field layout phase. Culvert size and length will be as specified in the road plan or as modified by actual field conditions and personnel experience; culvert lengths necessary may be modified in the field during road construction as well.

Culvert placement, alignment, drop, outlet, rip-rapping, and proper depth of fill necessary will be specified by the Roads Forester or the Forest Officer-in-Charge and the installation approved by the latter. Culverts exceeding 36 inches in diameter or double culvert installations will be installed with the supervision of either the Roads Forester or the Forest Officer-in-Charge and with the final approval of both. If a bridge is to be built, it will meet or exceed B.I.A. (Flathead Reservation) Log Bridge Minimum Specifications or alternative specified standards. The construction will be supervised by the Roads Forester and final approval given by that individual.

(4). Grading and Ditching
The rough road surface following construction will be graded and ditched, if required, as soon as it is practical. Grading or grading/ditching will continue as necessary until the roadbed and ditches are stabilized. Ditching requirements are listed in Table IV-1: Road Standards New Construction Specifications, page 145.

(5). Stabilization and Surfacing
Occasionally some logging roads will require stabilization following construction. If a road cannot be re-routed to avoid an unstable area, then stabilization of the roadbed will be performed. This will usually mean either additional drainage measures will be undertaken and/or

additions of aggregate/fill will be brought to the site. Stabilization of trouble spots will be required on all high and intermediate standard logging roads and recommended on low standard roads. The Forest Officer-in-Charge will have responsibility for the decision.

In general, on the Flathead Reservation, logging roads have not been artifically surfaced other than in places where aggregate or road oil has been used for stabilization purposes. This policy will continue with this Forest Management Plan. Proper road surface preparation and maintenance during the life of a timber sale will allow economic removal of forest products without other surfacing being needed.

Proper road surface preparation should provide a compacted earth surface with efficient crown, out slope, or rolling dips to permit rapid draining of water from the surface with an absolute minimum of erosion occurring. Grass seeding will help stabilize cut and fill slopes.

4. Maintenance
Logging road maintenance is a vital function that is necessary to protect the construction investment, provided the road is to remain open and usable. In the past much of the road maintenance performed here has been on a hit-and-miss basis or in response to crisis situations, because of a lack of adequate regular funding. An overall maintenance plan has not been developed to assure continuing inventory of logging road condition and maintenance where and when necessary. Thus many of the open logging roads, bridges, and culverts on the Flathead Reservation are in bad condition.

Basically, there have been three approaches to maintenance of logging roads during the past management plan period. The first and primary maintenance tool has been the BIA Road System Maintenance Contract. For a description of the system see Section IV.D.1. BIA Road System.

a. BIA Road System Maintenance Contract
This maintenance contract provides for an annual bid contract (usually awarded to the low bidder) for maintenance of approximately 345 miles of usable logging roads, bridges, and culverts. Approximately 45 miles of other logging roads on the BIA Road System are currently closed to

removal of timber and are not included in the total shown. See Section IV.D.1.a. BIA Road System. For the most part the logging roads that are part of the BIA Road System, and covered under the maintenance contract, are access and main haul routes. Under this contract in the past most of the essential main hauls and access routes have been maintained in usable condition. Bridges and culverts have almost exclusively been maintained on a failure/repair or replacement basis (i.e., crisis management). Generally most flood damage repair has been managed within the contract budget or with small additional emergency funding.

At current funding levels it is not possible to maintain more than one-half of the complete BIA Road System in any one year (depending upon bridge and culvert repair and replacement needs). Because of this limitation an annual maintenance plan will be developed with categories of priorities to be followed.

b. Timber Sale Purchaser Maintenance

The second maintenance tool used in the recent past has been maintenance required and performed by timber sale purchasers on active logging units. They are required to maintain logging roads in a suitable condition so that adverse environmental damage (principally erosion and road failure) does not happen. Road maintenance must be acceptable and be approved by the Forest Officer-in-Charge.

BIA System Roads that are within the boundaries of or provide access to, an active timber sale have been maintained by the timber sale purchaser. During this next planning period the above stated maintenance policies will be continued on active timber sales.

The timber purchaser at the conclusion of the timber sale activity will leave all BIA System Roads in a condition similar to (or better than) that which existed at the commencement of the sale.

All other logging roads must be left in a usable condition. They will be given a final blading to remove any ruts and berm. The road surface should be left crowned or outsloped, and any ditches should be cleaned out. Spur roads (low standard) may have their surfaces left in a roughened condition (anticipating closure) to facilitate grass establishment; main haul roads will be left with a smooth, compact surface. All roads used in logging activity within the logging unit will be seeded with grass seed as part of the final maintenance. The grass will impede the encroachment of noxious weeds and help to stabilize the road surface and cut/fill slopes to minimize erosion.

c. Other Maintenance Approaches

The third general approach used during the past management period was to perform no other scheduled maintenance. The reason for this was and is because no money is budgeted in either the BIA Forestry Branch or Tribal Forestry budgets for road maintenance or repair/replacement. Unless a crisis came up, the job of simple maintenance of clearing the roads in the spring and filling in minor holes in the roads was left to the first Forestry Branch employees or crews that used the road (or the public, if they were first). If a road crisis occured that was not covered under either the BIA Road System Maintenance Contract or a timber sale contract, then either an attempt was made to use available local employees and equipment (i.e., fire crew personnel and the Forest Development cats), or an appeal was made to the Area Office for emergency funding. This had worked to some extent in the past.

Budgeting for road, bridge and culvert maintenance on open logging roads that currently have no provision for scheduled maintenance may be pursued as one alternative during the next ten-year plan period.

A second alternative that will be pursued is to set up a Road Maintenance Account with monies set aside under active timber sales (similar to the Timber Stand Improvement-TSI-Account). This would be a set amount per thousand board feet of timber cut and scaled. These account funds would be available for logging road maintenance use throughout the reservation whenever they are needed.

5. Stabilization

Additional stabilization of certain roads and road beds (essentially on low standard, spur roads) may be necessary after logging activity is completed. Before a timber sale contract is closed out, the purchaser shall perform any additional stabilization work needed as directed by the Forest Officer-in-Charge. This will take the form of grass seeding of road surfaces, road banks, and cut and fill slopes.

Addition of fertilizer and/or mulch may be needed to insure successful grass establishment on harsh sites.

In certain cases drainage of excessive runoff of ground water - beyond use of existing culverts, ditches, and/or rolling cross dips, - may be necessary to stabilize logging roads and control soil erosion. Additional mechanical methods of outsloping and/or water-barring may be required. However, water bars will not be used on access or main haul routes; and they will only be used on low standard, spur roads as a last resort. The Forest Officer-in-Charge will be responsible for any decisions with regard to water-barring on spur roads. Any unauthorized roads or go-back-trails that have been created will be water-barred, as a minimum, to rehabilitate the road or trail into productive growing sites.

6. Road Closure/Road Opening

Road closures may be implemented to limit or prevent use of individual roads or partial or complete road systems. These closures may be used for: 1) minimizing erosion or failure of road surfaces and roadbeds; 2) limiting the harassment or hunting pressure on big game; 3) protecting key wildlife areas, range land, or archeological sites; 4) reducing road maintenance needs and costs; 5) discouraging trespass on Tribal lands; and 6) reducing the risk of man-caused fires.

Road openings will be performed when they are requested by Tribal members and they conform to the Tribe's multiple use policies.

During this next ten-year planning period on the Flathead Reservation road closures will take one of three forms: seasonal closures, temporary closures or road abandonment.

a. Seasonal Closures

Seasonal closures or restricted access will ususally be accomplished by installation of locked cables or gates. They will be put up only on an "as needed" basis, and they will be removed when no longer required. Seasonal closures may be initiated and enforced under either a Forestry Branch, BIA, or Tribal administrative action, or by means of a Tribal Council resolution or ordinance. Seasonal closures will normally be short-term and might be used, for example, to close roads during very high fire danger, to protect wildlife calving or nesting in season, or to

Road closures are sometimes needed to protect key big game areas.

prevent damage to newly constructed logging roads until the road prism has stabilized.

b. Temporary Closures

Temporary road closures will most often be done by the construction of Kelly Humps at or near the beginning of each road to be closed. Normally these closures will be done on a timber sale area basis and will be considered and implemented following completion of timber sale activity and follow-up Forestry Branch administrative and reforestation work.

The planning and field completion of temporary closures on finished logging units will be under the Road Closure Program within the Branch of Forestry. The program is staffed with both Tribal and BIA personnel and utilizes the Forestry Branch backhoe for constructing the Kelly Humps. Planning will begin by obtaining input from all Forestry Branch Sections and the Wildlife Branch. Following the initial determination of which roads to close and which to leave open within a unit, the entire plan will be reviewed by the Roads Forester, and then checked with Forestry Section heads and the supervisory Wildlife Biologist.

The unit closure plan will then be presented to the Tribal Council for their review, input, and approval before field work begins. Requests for construction of individual, temporary closures, or the re-opening of individual roads with temporary closures on them, will be directed to and handled by the Roads Forester.

c. Road Abandonment

Permanent road abandonment will be done on logging roads that are determined to be no longer needed for any current or future logging use. These abandonments will primarily be old spur roads where the road spacing was less than is needed now under the present state of technology and using locally available logging equipment. Abandonments will be accomplished by either a series of Kelly Humps to permanently block the road; or, if considered necessary for rehabilitation of the site, a partial or complete reshaping of the roadbed to conform to the original slope gradient.

The approval of the Tribal Council will be solicited for any road abandonments.

D. Access Roads and Transportation Plan

1. Access Roads

a. BIA Road System

The Bureau of Indian Affairs Road System provides public access routes to tribal timbered lands. The system contains 390 miles of mostly high or intermediate standard logging roads, which are primarily access or haul routes connecting to county roads and state highways. Generally low standard spur roads are not included in the Bureau of Indian Affairs Road System.

The Roads in the system may be restricted in use or closed to public access "when required for public safety, fire prevention or suppression, or fish and game protection, or to prevent damage to unstable roadbed" (25 CFR 170). Under this authority the Superintendent of the Flathead Reservation in the recent past did restrict the use of 45 miles of Bureau of Indian Affairs System Roads in the South Fork of the Jocko River. These particular roads are closed to non-Tribal member use and the removal of forest products. Thus, there is a total of 345 miles of useable logging roads within the Bureau of Indian Affairs Roads System.

The complete system is maintained under a yearly contract let by the Bureau of Indian Affairs that provides for road, bridge and culvert maintenance and repair or replacement.

b. Other Access Roads

There are many miles of other existing access and main haul roads throughout the reservation. Construction or reconstruction of additional access/main haul logging roads for timber management purposes will occur duing the next ten years. The existing access/main haul roads are used regularly for forest administration, fire control, and a variety of other uses; however, presently they receive maintenance only when they are accessing or within a logging unit under contract for removal of forest products, or when a crisis or failure occurs on a road, bridge or culvert.

2. Transportation Plan

The Forestry Branch of the Bureau of Indian Affairs is in the process of compiling a Transportation Plan which will cover all of the lands and roads concerned with management of the forest resource. Within the period of time covered by this management plan, the Branch of Forestry will complete this plan and keep it up-to-date.

The primary reason for formulating and completing this Transportation Plan is to allow the Forestry Branch to assess the current status and plan for future needs for logging and other forest management access. From this analysis, problems can be discovered and solutions can be proposed. Right-of-way, easement, purchase, condemnation, prescriptive right, or other action can then be pursued with a maximum amount of lead time. This should help to avoid "crisis" situations.

a. Land Ownership/Road Status

The Transportation Plan will delineate all of the land ownership that could be important to the forest management activities. The plan will also show road and right-of-way status for all roads needed for use in forest management - all state highways, all county roads, all Bureau of Indian Affairs System Roads, and necessary tribal, allotment, and private roads. This information will help to identify tracts of land or roads where ownership or right-of-way may need to be acquired. It will also aid in identifying those county roads which will be needed for access and log hauling; thus, it will help in coordinating with the county commissioners of Lake, Sanders, Missoula and Flathead Counties for use of those particular roads as future haul routes.

b. Road, Bridge and Culvert Inventory
The Transportation Plan will eventually include the results of a field inventory of all roads, bridges and culverts, including pertinent portions of the county road network and associated bridges that relate to potential forest management activities. With this inventory an evaluation will be made of the existing conditions to determine which roads and structures will require maintenance and or re-inventory to accomodate future log movement. The condition inventory will be updated on a periodic basis and re-evaluations performed as necessary. With this information, efforts can be undertaken to communicate and resolve maintenance or repair needs (perhaps on a cooperative basis) through this plan period.

During this plan period a Bridge and Large Culvert Inventory for the Flathead Reservation will be completed and kept up-to-date. All bridges and single culverts larger than 36" in diameter, or double culvert installations, will be extensively inventoried for condition. In addition, a field inventory of the condition of all roads will be completed.

c. Logging Road, Bridge, and Culvert Identification
The Forestry Branch will finish, as part of the total Transportation Plan, a complete office and field identification by road number of all logging roads. This identification will provide personnel with an easier and more efficient system for locating specific logging roads in both the office and field. This will provide needed help in the overall management of the forest lands on the Reservation.

(1). Orthophotomapping Project

The Forestry Branch in conjunction with the U.S. Geological Survey is currently engaged in a project to completely update the mapping on the Flathead Reservation using orthophotographs. The resulting orthophotomaps will be the base maps used for all forest management activities on the reservation.

This project will go beyond normal U.S.G.S. mapping and updating. The U.S.G.S. will alter their normal production schedule to produce new topographic quadrangle maps where necessary; the Forestry Branch will provide additional information and data which will be incorporated into final orthophotomaps specifically produced by the U.S.G.S. for the Bureau of Indian Affairs, Flathead Agency.

Among other important data provided, existing roads, all the access routes, main hauls, and logging spurs for tribal forest land on the reservation, will be identified. In addition, new roads not shown on the orthophotographs will be located by the Forestry Branch personnel by stereo plotting from new aerial photographs and identified. All of these roads will be identified on the new orthophotomaps by road number, based upon the following logging road numbering system.

(2). Reservation Forest Road Number System

For the purpose of logging road identification, the reservation has been divided into fifteen Road Units (Figure IV-1). The boundaries of these Road Units are by priority: 1) the Reservation boundary, 2) major highways or primary access roads, 3) major topographic features, and/or 4) section land lines.

Within each Road Unit all logging roads will be systematically identified by a common letter or letters followed by a four-digit number (i.e., D-1000, B-4300, HS-5510, FB-3711), which will indicate the type and relative location of each road. Gaps in the numbering sequence will be left in undeveloped and partially developed forest areas to allow for identification of additional roads constructed in the future.

FOREST ROAD UNITS AND COMPARTMENTS

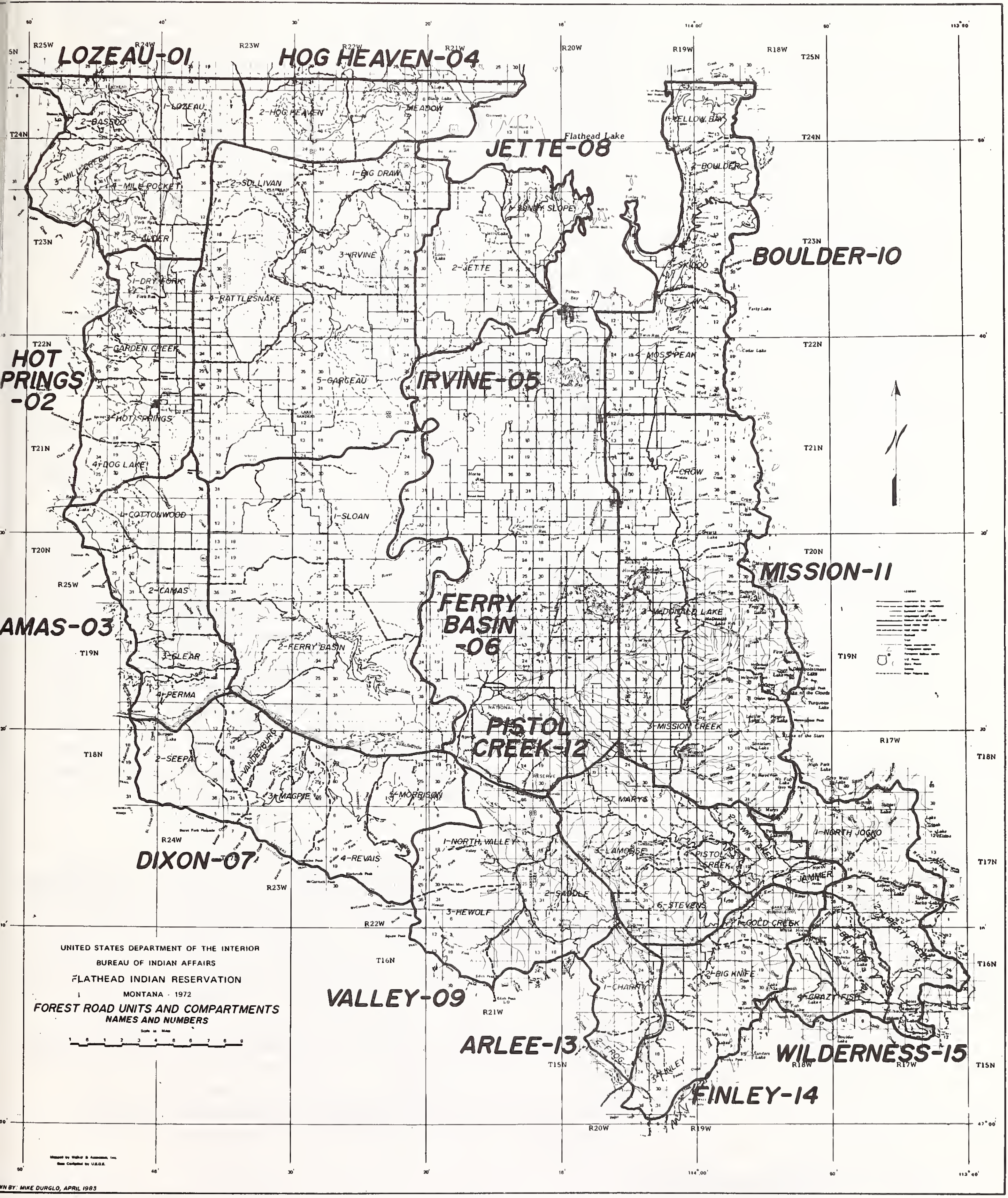


Figure IV - I

(3). Road Sign Project

The Road Sign Project to place identifying signs on each numbered road was initiated in 1980. Sign production and placement began in 1981. During this ten-year planning period the Forestry Branch will complete the production of an estimated 3,200 wooden road signs and post all of these signs in the field. Signs will be posted at the beginning of all roads and at intersections and elsewhere as needed.

(4). Bridge and Culvert Identification

All bridges on numbered logging roads on the Reservation will be identified with a number. All "large" culverts - a single culvert larger than 36" in diameter or any double culvert installation - will be identified by number.

Bridge and large culvert identification will make use of the logging road numbering system and expand on it. Each bridge or large culvert number will be prefixed with the road number of the logging road that the structure is located on. This will be followed by a two-digit number that represents the structure itself. A large culvert will have a "C" following the structure number. Bridges and large culverts will be numbered consecutively up individual logging roads from -01 (at the lower end or start of the road) on through the highest or last structure on that road. For example, a bridge and two large culverts all located on the same road (i.e., W-2000) would be numbered as follows: W-2000-01, W-2000-02C, and W-2000-03C.

The field condition reports in the *Bridge and Large Culvert Inventory for the Flathead Reservation* will all identify the bridges and culverts referenced by individual structure number on each report. Each of these bridges and culverts will be field tagged or labeled with its structure number for easy reference and identification. A county bridge or culvert on a numbered logging road will not be tagged or labeled with its number in the field; it will, however, be included in the *Bridge and Large Culvert Inventory* and numbered in sequence.

E. Rights-of-Way

Rights-of-way easements will be acquired in order to facilitate orderly development of forest management. The Branch of Forestry will pursue new easement corridors in accordance with Federal and State of Montana statutes. These policies, procedures, and guidelines deal generally with routine situations in which a grant of easement is not extremely difficult to obtain. On the Flathead Reservation, as a result of the checkerboard pattern of landownership, many landowners have closed roads that access trust property and/or are adverse to grant rights-of-way for new roads that would access trust timber reserves. In other instances, landowners have attempted to put conditions on road use that would limit access to less than that for which the road has been historically used. In attempts to solve disputed access to trust property, negotiations have been made with landowners which resulted in precedent setting concessions. Thse precedents will serve only to make resolution of disputed access to trust property more difficult and unreasonable. For those reasons a new policy for the acquisition of rights-of-way has been developed. This policy will not supercede, but will supplement existing policy and procedure.

Every effort will be made for negotiations from a position of strength throughout any dispute. After thorough research of the subject right-of-way has been conducted and historical use and type of easement have been established, the documented research and Bureau's position will be formally presented to the landowner for his information and further action. Continued use of the road (if established) will be made throughout the negotiation process; as easement by adverse possession will be established if necessary.

Rights-of-way for difficult cases will first be established by proof of existing legal documents. In many instances on the Flathead Reservation, rights-of-way have been granted and formalized by legal documents which were never recorded. Some of those documents have been subsequently lost or misplaced. It will be the Branch of Forestry's first priority to thoroughly research road use, county records, agency records, etc., to determine if a road right-of-way was ever granted. That evidence will be presented to the landowner of the right-of-way.

In the event there is no evidence of the grant of right-of-way being formalized by legal document, the existence of the right-of-way will be established on a case by case basis in the following priority: 1) as an easement by prescription, 2) easement by adverse possession, 3) easement established pursuant to the Treaty of Hellgate, 4) implied easement, 5) negotiated easement, and/or easement established pursuant to court order.

The Flathead Tribes and individual Indians may continue to pursue for settlement of disputes in the State Court System if the Bureau's trust responsibility can't be performed in a timely manner. Consultation with the Confederated Salish and Kootenai (Flathead) Tribes will be maintained, throughout all the stages outlined by this policy. Adequate notice of the Forestry Department's position and intentions will be provided to affected parties.

F. Land Acquisition

If more efficient timber management sale is to be effected an active land acquisition program should be vigorously pursued with the Tribes during the plan period. Consolidation of tribal ownership will permit more efficient management of all Tribal resources. Intermingled ownerships present right-of-way problems and complicate stumpage appraisals, logging road system design, fire suppression, and other management activities. The land status plat book in conjunction with timber type maps and logging unit maps will reveal areas requiring action. Those needing immediate attention are:

1. State Lands

   The State of Montana was awarded Sections 16 and 36 in each timbered township. Tribal purchase or equitable exchange should be made of these lands where feasible.

   The legal status of unsurveyed State Sections 16 and 36 within the exterior boundaries of the Reservation should be resolved promptly.

2. Private Lands

   The purchase or equitable exchange of private lands adjacent to tribal holdings should be pursued from the standpoint of consolidation and to provide unrestricted access to tribal lands.

3. Allotments

   The purchase or exchange of tribal lands for allotted lands should be closely monitored to insure that the Tribes continue to consolidate their ownership interests in divided ownership allotments.

   The Tribes should be kept informed concerning the transfer of key allotted tracts to fee status, and encouraged to purchase these allotments when beneficial to the management of their resources.

G. Permit Program

1. General

   Forest products harvested other than under formal contract will be administered through the Permit Program. Forest products may be harvested for personal use without a permit when cut from an allotment by an Indian who holds sole beneficial interest. Tribal members may also harvest, without a permit, for personal use such forest products as may be approved by the authorized Tribal representatives and the Secretary from unallotted trust lands within the Reservation. For the purpose of this discussion, rules and regulations for Christmas trees will be handled separately from all other forest products.

2. Allotted or Individual Forest Trust Lands
As provided in CFR 25, Indians with sole beneficial interest in individual trust land may harvest forest products for personal use, without a permit. However, such products that may be harvested shall not be sold or exchanged for other goods and services. Administration of this type of timber harvesting is difficult. Should the trust landowner choose to sell or exchange forest products, a permit is required.

3. Permits Required
All other individual trust land timber harvested other than under Timber Sale Contract shall conform to the policy and general regulations contained in 53 BIAM 4 and CFR, Title 25.

Generally, individual trust land will be managed for the needs and best interests of the Indian owner(s) and their heirs, provide for the best utilization of the land, and consider the present and future financial needs of the owner(s).

Sound judgement will be necessary when considering cutting permit requests. Since each request requires significantly different considerations, only general management guidelines will be discussed. Guidelines are summarized as follows:

1) The wishes of land-owners will be considered for issuing and administering permits.

2) To manage for the highest and best use and maintain the land in a productive state.

4. Trust Lands
Harvesting of forest products other than under formal contract on unallotted forest trust lands shall be governed by Tribal policies, 53 BIAM 4 and CFR 25 (BIA, 1978 and CFR, 1984).

The Federal regulations cited above serve as broad guidelines within which the Forestry Branch of the Tribes develop a permit program that serves the needs and interests of the Indian landowners. Annual Policy and Procedural Statements are required by BIAM and are the main vehicles by which the permit program is updated and continues to meet the objectives of serve to the Indian landowners. Harvesting of forest products under the Permit Program is limited to free use material as determined by the Tribes, or stumpage values not exceeding $20,000.00. Within these limitations, the expedience in processing of a Timber Cutting Permit allows considerable flexibility in the administration of a wide range of Forest Management activities. Timber Cutting Permits, both free use and paid, are used extensively in the administration of lodgepole management activities. Miscellaneous small sawlog sales for blowdown and insect and disease salvage, sanitation cuttings required in mistletoe control, and other damage agents, are frequently administered through timber cutting permits.

The above uses of Timber Cutting Permits and the harvest of miscellaneous forest products such as fuel wood and pulp wood are a major factor in the local employment picture. Several small operators depend heavily on employment opportunities offered through the Permit Program and employment is a major thrust behind the Tribes involvement in the development of permit policy.

5. Christmas Tree Permits

The Tribally sponsored harvest of wild Christmas trees is administered under the permit program of the Branch of Forestry. The Christmas tree cutting regulations are developed primarily by the Tribes as authorized by Tribal Ordinance 26A. The responsibility to issue and administer the Christmas tree cutting permits rests with the Bureau's Branch of Forestry.

The present regulations allow for indiscriminate harvest of Douglas-fir, grand fir, alpine fir and Engelmann spruce trees up to four inches d.b.h. The only significant limitation is that thinned and/or planted areas are closed to Christmas tree cutting.

The Christmas tree program has remained essentially unchanged since it's inception more than 30 years ago. Indiscriminate harvest of Christmas trees from unthinned areas coupled with a dramatic increase in acres thinned during the last 10 years has significantly reduced the area where good, wild Christmas trees can be found. The Tribes have not made any significant attempts to manage the land for a sustainable supply of Christmas tree industry on the Flathead Reservation. The Tribes recognize this trend and have recently expressed some interest in introducing some level of management into the Christmas tree harvest program.

This management plan has a stated objective to develop a diversified Christmas tree harvest and market program for the Tribes view during the plan period. The details of this project are to be developed in cooperation with the Tribes and technical assistance supplied during the implementation of any such programs.

H. Sales Policy

1. General

This section of the Forest Management Plan will serve as a guide for planning and implementing timber sales during the 1982-91 period. It will cover items that will be considered in scheduling, planning, and preparing timber sales.

2. Five Year Timber Sale Plan

The Five Year Timber Sale Plan outlines when and where the harvest of timber is to take place for the next five years on the Reservation. The Plan prioritizes areas from which to harvest the AAC and prescribe other silvicultural treatments, based on the following criteria:

a. Stand Conditions - As a result of monitoring the forest through CFI, annual forest pest survey flights, extensive ground reconnaissance and intensive stand examinations, forest disease, insect and overstocking problems and general stand vigor and risk are noted. Areas having high numbers of stands showing significant mortality or growth loss will be scheduled as soon as possible in an effort to minimize losses and restore the lands to a perpetually productive state.

b. Site Productivity - Other considerations being equal, areas of highest productive potential will be scheduled ahead of areas with lower potential, in an effort to optimize social and economic returns on investments. Habitat types and habitat type groups will be one tool used in evaluating productivity potential. Soils information will be another.

c. Time Since Last Entry - Other considerations being equal areas having the longest elapsed time since the last entry will be scheduled first. A 20 year average cutting cycle or re-entry period will be used for the reservation forest. This approach will facilitate the regulated distribution of age classes, so important to uneven-aged management, by providing the opportunity to establish new age classes on site specific, but near 20 year intervals.

d. Cummulative Environmental Impacts - Every attempt will be made to schedule sales to spread the harvest activity, disturbance and environmental impacts over the widest land base possible. The intent is to isolate active timber sale areas from one another and from other resource management activities to avoid cummulative effects that might negatively impact other resources especially big game. It is also the policy to minimize the impact duration in any given area as much as possible.

The Five Year Plan also provides an overview of expected income from timber for a five year period, which is desirable for the Tribes long range economic planning and program budgeting. The Plan establishes an objective for which the BIA and TFME can allocate and budget the resources necessary to accomplish the objective, including balancing the workload between the East and West-Side Timber Sale Districts, and planning and coordinating activities both within and outside of the Branch of Forestry. Specifically, the plan goal is to maintain a base level of sale offerings (at 50% of AAC) in an attempt to insure a cash flow and attain a minimum level of income from forest products, totaling $3,000,000.00 annually.

Lastly the Five Year Plan is a stated objective that the local forest products industry can use for their wood procurement planning, and confirms to Indian loggers the maintenance of a stated level of preference sale offerings.

A copy of the Five Year Timber Sale Plan is contained in Appendix E.

3. Annual Timber Sale Plan

The annual timber sale plan is the annual up-dating and adjustment of the Five Year Plan to:

(1) Schedule sales in response to market conditions or product demands in an effort to improve stumpage receipts;

(2) Schedule sales to minimize losses from unforeseen forest pest problems or to respond to blowdown or fire damage;

(3) Respond to changes desired by the landowner.

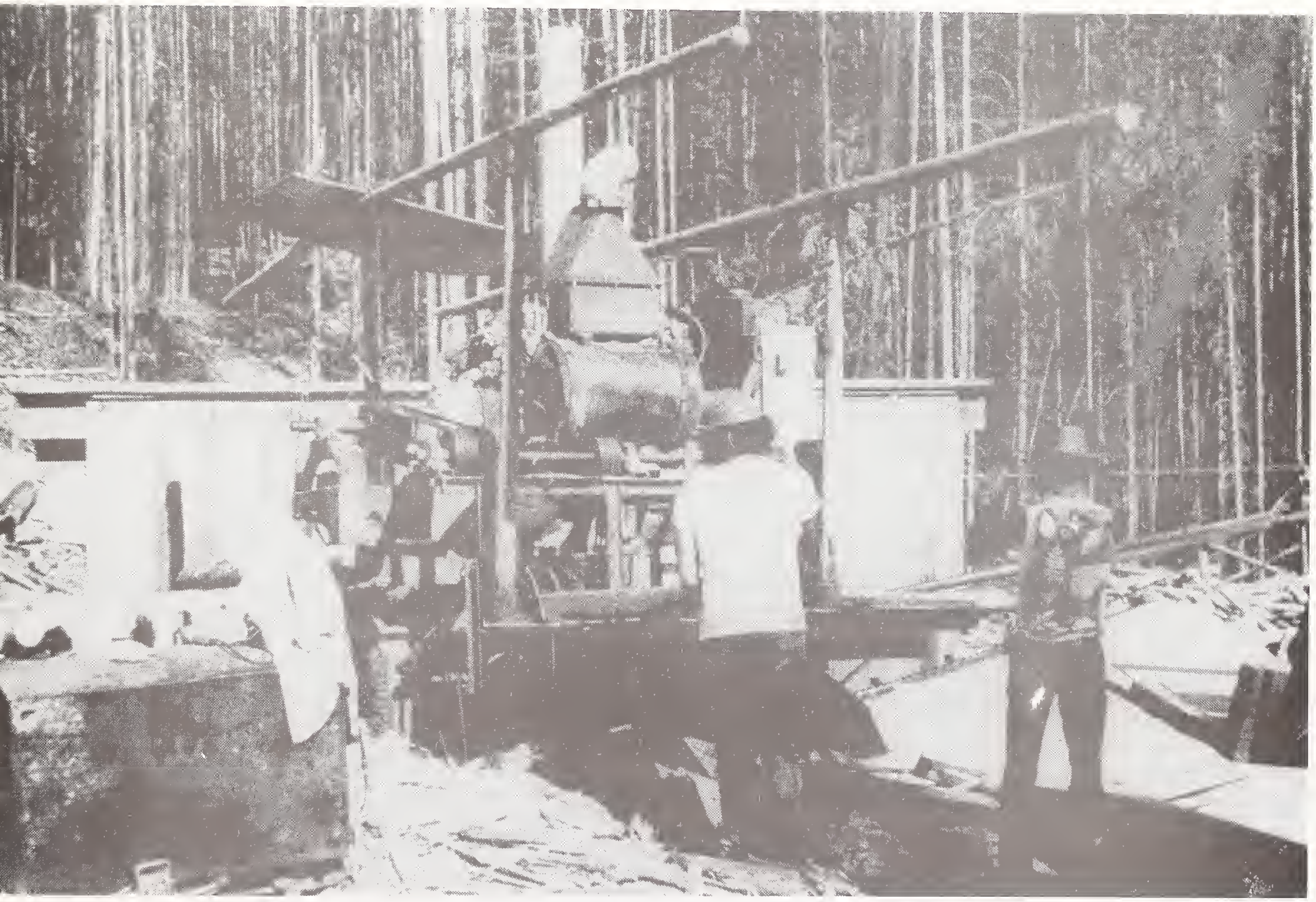
(4) Respond to Indian loggers for additional preference sales;

(5) Respond to changes in BIA or TFME staffing or capabilities or unequal distribution of the workload in regard to staffing at the two timber

sale districts; and

(6) Re-schedule carry-over volume from previous years where harvest objectives were not met.

4. Indian Preference Sales
To encourage development of Indian-owned forest operations, the Tribes have established an Indian preference sales policy. This policy allows Tribal members who are certified Indian loggers to meet the high bid of a non-Indian purchaser and be awarded timber sales which are 5 MMBF or less. To become certified, Indian loggers must complete an Indian Logger Certification Form (see Appendix G).



Indian owned and operated scrag mill.

5. Virgin and Old Growth Stands
Virgin and old growth stands not excluded from the commercial forest base will be accessed and treated according to the management strata they are assigned to. Stand condition will serve as the primary criteria for prescribing silvicultural treatment. Under no condition will more than fifty percent (50%) of the component be treated in this entry. Certain old

growth stands will be managed on a long rotation (300 years). Old growth management is discussed in Section III.J.4.page 77.

6. Sale Size
Sale areas, as scheduled in the five year plan, may be subdivided into two or more timber sales. The determination of sale size depends on a variety of factors, the most important being marketability and maximizing income to the Tribes.

Timber sales in the 15-20 MMBF range will be the largest offerings, and will be sold on three to five year contracts. This type of sale is favored by the major competitors for Reservation timber when market conditions are strong. Larger sales are also the most cost effective to prepare and administer, permit the most effective road development, and minimize the duration of activity in a given area.

Timber sales in the 5-10 MMBF range on three year contracts are sought by sawmills in weak markets, and by independent loggers who have to find buyers for their logs. Small volume sales reduce risk to purchasers in uncertain times and are generally less complex in terms of logging systems required, species composition, sale development and product mix. During weak markets these will be the largest sales offered in attempt to reduce purchaser risk and improve marketability.

Timber sales containing less than 5 MMBF will be advertised as Indian preference sales on a one or two year contract (or paid permit when appraised sale value is $20,000.00 or less). A sufficient number of sales in this size range will be offerred annually to fulfill the Tribes commitment to member loggers. Sales in this size range will generally consist of isolated sale areas, salvage or rehabilitation projects, or stocking reduction in second growth stands. Small sales are more costly, per unit of volume, to prepare and administer than larger sales, and often are less competitive due in part to a lack of interest from non-Indian buyers on the preference sales.

Given the market demand, the annual sales offering will consist of one or two of the large sales previously described, 3-8 of the mid-size sales and as many small sales and paid permits as needed to satisfy the Tribes' commitment to the Indian preference policy.

7. Logging Methods and Specialized Equipment Requirements
Generally, tractor logging will be restricted to terrain where slopes are less than 45 percent. Cable

systems will be required on slopes that are steeper than 45 percent. The type of cable system required will depend on the external yarding distance, or road spacing. Jammer systems can be used when yarding distances are 600 feet or less. When yarding distances exceed 600 feet or where a reserve stand must be protected a more sophisticated skyline yarder will be required. Helicopter logging will be considered only in situations where high value losses would occur such as salvage of high value timber, and only if the landowners would be willing to accept the reduced stumpage that would result. Mechanized tree shears or feller-bunchers offer opportunities to economically harvest small trees that heretofore could not have been, using a conventional logging methods. Generally these types of machines are restricted to gentler slopes. Sales that are designed to be logged by these type of machines will be offered as market conditions for round wood and small sawlogs allow. Ground based skidding equipment will not be used on soils susceptible to compaction. See Section III.H.3. for more information regarding soil compaction and displacement.

John Deer Tree Harvester operating on the Hot Springs Commercial Thinning Logging Unit.

8. Rehabilitation and Low Value Sales
Rehabilitation projects, salvage areas, commercial thinnings and release removals that have very low value because of low (less than 2 MBF/acre) volumes per acre and low quality products, will generally be withdrawn from a proposed sale area and sold under a paid permit or small sale. Small areas of this type of marginal operation may be included in regular sales if inclusion does not substantially detract from the marketability of the overall sale, or require subsidizing the harvest of these areas by reducing the value of other products.

9. Timber Sale Preparation Procedure
This section provides a brief outline of the timber sale preparation procedure for the Flathead Agency. The sale preparation procedure is described with more detail in the Draft Presales Handbook located in the Branch of Forestry.

For contract sales less than two MMBF usually only one person is designated to prepare the sale. For contract sales of more than two MMBF a two or three person team is assigned as the sale preparation team for the Branch of Forestry. Details of the team concept are contained in the Timber Sale Handbook located in the Branch of Forestry. Briefly, the sale preparation team consists of a Forest Officer, a Presales Officer and a Trainee. By having the Forest Officer help prepare the sale, he knows more about the sale and does a better job of administering the sale after it is sold.

An interdisciplinary (ID) team approach is used for planning all sales over 5 MMBF and small sales with significant concern for non-timber resources. To insure multiple use objectives are met, the timber sale planner, or planning team coordinates with BIA staff, Tribal staff and other agencies and individuals.

The sale preparation procedure is outlined below in the general sequence in which the tasks are to be accomplished. Many of the tasks can be performed concurrently and some tasks are not required for every timber sale; therefore, sale preparation for a particular timber sale may differ somewhat from the procedure described.

a. Approval to Prepare Timber Sales
The approval to prepare timber sales is obtained from the Tribal Council once each year at the time the Council reviews and approves the updated Five Year Timber Sale Plan. Approval for sales not on the plan is obtained when the need for such a sale

becomes apparent.

b. Assignment of a Timber Sale to a Team or Individual
The first step is the assignment of a timber sale from the Five Year Timber Sale Plan to a team or individual as described above. The Presales Section Head, Timber Sale Section Head and District Forester, collectively assign a sale preparation team. All ID team sales are to be assigned at least two years prior to the target date for selling the sale.

c. Reconnaissance and Interdisciplinary Coordination
The sale preparation team gathers information available concerning the proposed sale area. Important sources of information include: aerial photos, old Forest Officer's reports, type maps, orthophoto maps, yellow cards, soils survey, the transportation plat book and BIA and Tribal staff familiar with the area.

The primary purpose of the initial sale reconnaissance is to prepare a map of the proposed sale area that delineates the proposed management systems (uneven-aged, even-aged or temporary even-aged), logging systems (cable-tractor), and limited management areas.

The team contacts Forestry Section Heads, Tribal Natural Resources staff, other BIA branches and other agencies and individuals as needed to insure that good multiple use planning occurs for the specific forest area involved. Coordination will be made with the branches of Wildlife, Roads, and Land Services, Tribal Natural Resources, Tribal Recreation, the Culture Committees and others as appropriate. Interdisciplinary coordination and planning is scheduled for the period one to two years prior to the target sale date (bid opening date).

d. Cultural Resources Survey
A request for Cultural Resources Survey is prepared in duplicate, logged with the Environmental Coordinator and mailed to both the Flathead Culture Committee and the Kootenai Culture Program.

e. Forestry Sale Planning Meeting
When the initial reconnaissance is completed and the team has prepared a map stratifying the sale by management and logging systems, the Presales Section Head calls a meeting of Forestry Section Heads, the Forest Manager and the Sale Preparation Team. The purpose of this meeting is to insure coordination within the Branch and to insure all

forestry concerns are presented at the Interdisciplinary Planning Meetings to follow. Concerns to be addressed include: Management strata, sale size, logging methods, and any special timber related conditions.

If the Forestry staff agrees that the proposed timber sale is a viable project, notification of the proposed sale is given to other resource experts outside the Branch of Forestry. Announcement of the Interdisciplinary Sale Planning Meeting is made three to five weeks prior to the meeting, so that Interdisciplinary Team members may assess the status of the resource they are concerned with in the sale area.

f. Sale Objectives and Issues Statement

The Sale Preparation Team develops a draft list of sale objectives and important issues for the sale. The sale objectives are fairly general and describe the most important goals of developing or protecting the resources in the sale area. The issues statement provides the Interdisciplinary Planning Team with a concise statement of each of the issues and background information for each issue. Examples of issues include:

Accessing and development of virgin or old growth stands - how much, if any, should be withdrawn from the timber base.

Even-aged and temporary even-aged management - visual impacts.

Uneven-aged management - timber stand improvement, Christmas tree resources.

Cultural resources and recreation values.

Big game winter range, grizzly bear management.

Fisheries, water, and soils.

Marketability, economics.

g. Interdisciplinary Sale Planning Meeting

After members of the ID Team have had opportunity to investigate the sale area, an interdisciplinary sale planning meeting is held. At this meeting BIA and Tribal staff and any other concerned individuals or groups may come and give input about their concerns for the sale area. This process is called scoping. The following people are specifically invited to this meeting:

Councilman from the local district
Forest Manager
Director of TFME
Director of Tribal Natural Resources
The Sale Preparation Team
  (Forest Officer represents timber values)
  (Presales Officer - notetaker/EA writer)
Flathead Culture Committee
Kootenai Culture Program
Personnel from other branches and agencies depending on the specific resources present on the sale.

The moderator for the meeting is the Presales Section Head.

After members of the ID Team have had opportunity to present their concerns and report on the resource they represent, a "Core ID Team" is selected to continue the sale planning effort. The Core ID Team is selected jointly by the Forest Manager and the Director of Tribal Natural Resources. Membership for the Core ID Team would generally consist of the following people:

Councilman from the local district
Forest Manager
Director of Tribal Natural Resources
The Sale Preparation Team
  (Forest Officer represents timber values)
  (Presales Officer - notetaker/EA writer)
One representative for each resource that is a major concern for the sale (these individuals may be from BIA, Tribal or other organizations)

The Presales Section Head remains the moderator for the Core ID Team meeting.

h. Core ID Team Meeting
The purpose of the Core ID Team Meeting is to establish the timber sale objectives. To develop two to four overall sale alternatives and to select a preferred alternative. If the team selects the "no-action" alternative, no further sale preparation is done. If a sale plan is agreed upon, several of the next steps may be undertaken concurrently. For complex timber sales, several Core ID team meetings and trips to the proposed sale area may be needed to develop the sale plan.

i. Environmental Assessment
The environmental assessment (EA) is a document required by law for federal actions that could significantly impact the quality of the human environment. The EA documents the scoping and decision making that occured at the interdisciplinary sale planning meetings. Notice of the availability of the EA and FONSI (Finding of No Significant Impact) is made in the Char-Koosta. The proposed sale plan as documented in the EA is to be completed at least one year prior to the proposed bid opening date.

j. Public Notice and/or Public Meeting
Upon the advice of the district Councilman, a public notice will be made and/or a public meeting held to inform the public of the proposed timber sale. Public notice will be made through an article in the Char-Koosta.

k. Timber Sale Layout
Once the sale plan is developed, sale preparation may continue by laying out cutting units and developing silvicultural prescriptions. Details for the procedures involving stand examination, silvicultural prescriptions and cutting unit layout are described in the Timber Sales Handbook (BIA, 1984).

l. Cruising
After the sale is layed out, the Presales Officer designs the timber cruise. The cruise is designed to achieve a combined sample error of five percent at one standard deviation for the total net cut volume. Any deviation from this accuracy standard must be approved by the Portland Area Office. Standard Cruise instructions are contained in USFS Timber Sale Preparation Handbook FSH 2409.24 R-1.

m. Forest Officer's Report (FOR)
Guidelines for preparing the FOR are contained in 53 BIAM Supplement 3. The manual describes the FOR as "a complete report setting forth all pertinent information of the proposed role of timber prepared by the ranking forest officer." The Presales Officer drafts the FOR in concert with the EA. While the EA documents the alternatives discussed at the ID Team Meeting and the general sale plan, the FOR specifies the detailed plan. The silvicultural prescriptions, access plan, timber volume and acreage information are included in the FOR.

n. Timber Sale Contract

Contract requirments are outlined in 25 CFR 163 and 53 BIAM Supplement 3. The contract is drafted by the Forest Officer. Contract provisions are written to accomplish the sale objectives stated in the EA and FOR.

o. Timber Appraisal

Appraisals are prepared to determine the value of timber and an advertised price for the sale. A variety of methods are used to determine stumpage value for a sale. These include; residual cost, delivered log price, comparable sales, and transaction evidence. The results of appraisals are discussed among the Presales Section Head, Timber Sales Section Head, and Forest Manager before recommended advertised rates are established.

p. Approval to Advertise

Once a recommended advertised rate is agreed upon, a Tribal Resolution to approve advertisement of the sale is drafted.

q. Area Office Review

All proposed sales with an appraised value exceeding $500,000 are submitted to the Portland Area Office for review. The Area Director usually delegates approval authority to the Superintendent after the sale package has been reviewed. Details of this policy are described in 53 BIAM Supplement 3 Portland Area Addendum.

r. Advertise

Announcement of a timber sale is made by mailing the advertisement and prospectus to all prospective purchasers on the mailing list maintained by the Branch of Forestry. Sales over 5 MMBF are advertised in the Missoulian, the Daily Inter-Lake, the Ronan Pioneer, and the Flathead Courier. Sales 5 MMBF and under are advertised in the Char-Koosta, the Ronan Pioneer, and the Flathead Courier.

s. "Show-Me" Trip

A field trip ("Show-me"),is conducted approximately one week prior to the bid opening to give prospective purchasers an opportunity to find out more about the proposed sale. Sample contracts and sale maps are provided to prospective bidders.

t. Bid Opening

All sales over 5 MMBF are sold by oral auction. A satisfactory sealed bid in accordance with the advertisement must be submitted to participate in the oral auction. Special bidding procedures apply to Indian Preference timber sales. Copies of bidding procedures are available in the BIA forestry office.

I. Continuous Forest Inventory (CFI)

1. General

The purpose of the continuous forest inventory is to determine the growth, stocking, health and productive potential of the Reservation forest. This is accomplished through periodic measurement and analysis of permanent sample plots. The Flathead CFI program began in 1962 with the establishment and measurement of 357 photos. The fourth CFI measurement was completed in 1980 and the analysis was completed in 1985. For more information on CFI see "Flathead Reservation Forest Inventory Analysis for the 1982-1991 Management Period" (Tootell et al., 1985).

In addition to our own analysis, the USFS Forestry Sciences Laboratory at Bozeman Montana has agreed to analyze the CFI and other growth data from the Reservation in light of mutual concerns of growth projections and treatment response evaluations. The objectives for this analysis are listed below.

a. Determine growth response to past management activities by ecologic habitat types.

b. Determine mistletoe impact.

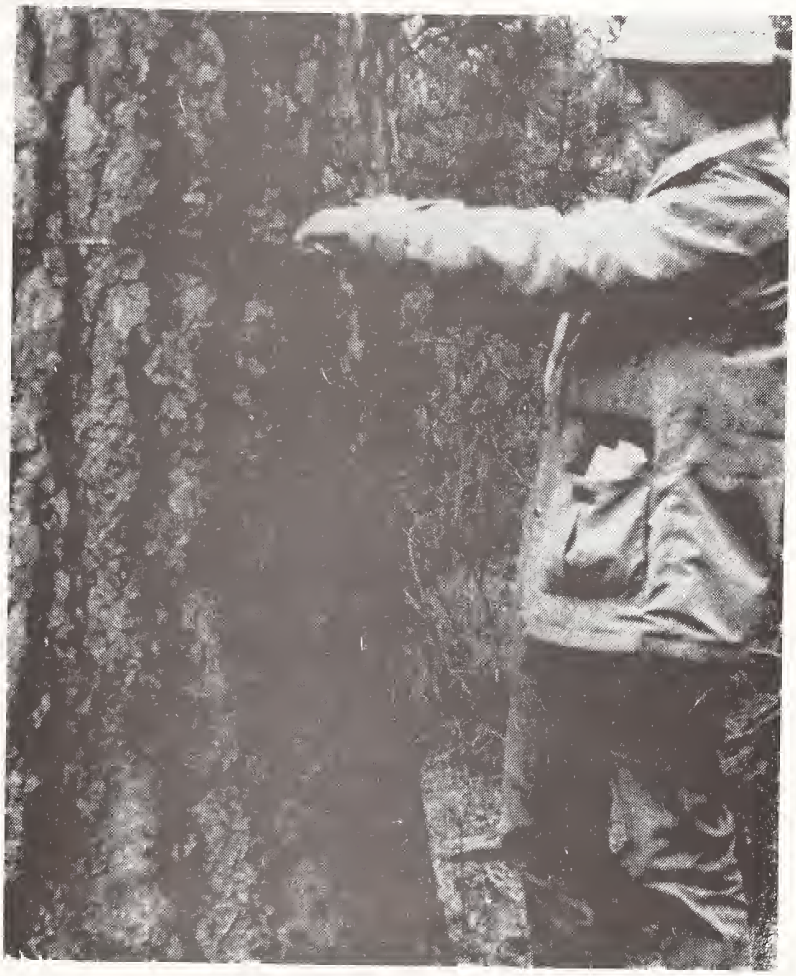
c. Determine the effectiveness of TSI.

d. Compare the actual growth reported by the CFI data with growth projections of the Prognosis Model.

The University of Montana also has the data on file as part of a Montana forest inventory consolidation project. At this time, the University's Mission Oriented Research Project (M.O.R.P.) is identifying research needs in the Northern Rockies. They requested the inventory data as a portion of the data base they will use for research.

2. Plot Maintenance

A plot maintenance program is important for locating the plots and tree stumps of plots that have been disturbed. During this management period, the key to the maintenance program will be Timber Sales notifying Presales of plots that are being logged. Presales personnel are to be notified after the trees are cut but before they are skidded so that tree tags can be removed from the bole and replaced on the stump of the felled trees. Other maintenance activities include locating plot center, replacing site reference trees that were cut, repainting faded numbers and symbols and anything else that would secure the location and integrity of the plot.



Forester Jim Beyer measures the diameter of an old growth ponderosa pine tree.

3. Suggestions for the Next Inventory

With every inventory effort, ideas emerge that could improve the quality and efficiency of the inventory. The 1980 inventory is no exception. Suggested changes are rather extensive therefore the reader is referred to the 1985 Forest Inventory Analysis.

J. Lodgepole Pine Management

1. Introduction

This is the first management plan written for the commercial lodgepole pine forest on the Reservation. Its purpose is to pull together the random practices of the past into a positive redirection of forest regulation to meet Tribal needs.

Past attempts at more intensive management were hampered by a poor market for post and pole products, the predominate resource, and the undesirability of lodgepole sawlogs. The Tribes started their own post yard in the early 70's to utilize this resource and create employment opportunities for the local Indian population.

The local post and pole industry has been the moving force behind the movement toward more intensive management in the lodgepole pine forests of the Reservation. The Tribes recognize the need to stabilize the raw material source for their post and pole plant. The Bureau of Indian Affairs, as trustee, has responded to the Tribes' desire for more intensive management by preparing this Forest Management Plan for the lodgepole forests of the Reservation.

This management plan serves as a guide for bringing the presently unmanaged lodgepole pine timber type into management for posts, poles and sawlog products. It is recognized that there are other uses for this resource and mitigating actions will be taken to minimize the impact on these other uses. However, specific management actions to enhance such uses as wildlife, water, recreation, etc., are not included and the reader must refer to Section III.F. for more information on these topics. Included herein are discussions of goals and objectives, regulation, silvicultural and management policy and action plan policies on implementing the overall plan.

2. Summary of the Lodgepole Pine Management Plan

a. Lodgepole Inventory

In 1972 the Reservation forests were timber typed to a primary and secondary cover type and size class. Non-stocked, sapling, pole, mature sawtimber and overmature sawtimber classes were identified. Single type calls were designated when at least 80 percent of the basal area of the stand was in a single type and size class. Dual species types were designated when each species comprised 20 to 79 percent of the basal area of the stand. All timber types were also coded as cutover or virgin and accessible or inaccessible.

In 1977, 1978, and 1979 an extensive inventory of the accessible lodgepole pine timber type was conducted by the Tribal Forest Management Enterprise. The primary purpose of the inventory was to gather the necessary information to begin management planning for the previously unmanaged lodgepole pine timber types. A detailed analysis of the lodgepole inventory data is contained in the Flathead Reservation Forest Inventory Analysis for the 1982 - 1991 Management Plan Period.

b. Acreage and Volume Summaries From the Lodgepole Pine Inventory

Acreage:

Inventoried	25,588 1/
Uninventoried	5,357
Seedling	1,370 2/
Dozer Thinned	1,028
Total Commercial	33,343

Volume:

Total Fence Posts	Net Harvestable Fence Posts	Gross Bd.Ft.
20.93 MM	16.26 MM	178.39 MM

c. AAC and Regulation Summary

Fence Posts:	452 M posts/yr.
Board Feet:	2.97 MM Bd. Ft./Yr.
Acreage:	375 acres of the target 15,000 acre post and pole management base regenerated each year.

d. Management Alternatives

Four management alternatives for the lodgepole pine timber type were developed by the Branch of Forestry and alternative (2) (below) was selected by the Tribes in July of 1980. This plan is based on that management alternative. The alternatives that were considered are listed below:

(1) Manage the commercial lodgepole component for sawlog production. This would entail salvage of the existing post and pole volume during the conversion period. Subsequent post and pole production would then be limited to commercial thinnings from sawlog stands.

1/ Updated Inventoried acreage as of April, 1984.

2/ Harvested since the inventory and subsequently regenerated to LPP. These acres to be managed for post and pole production.

(2) Manage the commercial lodgepole component for posts, poles, and sawlog production. A land base for post and pole production would be developed from the existing component and the remainder would be managed for sawlog production.

(3) Manage the entire commercial lodgepole component for post and pole production.

(4) Continue the present practice of unregulated cutting in the post and pole component with rehabilitation to follow on an as needed basis.

e. Management and Silvicultural Policies

(1) Management Policies - General management policies established within the Forest Management Plan are also applicable to the lodgepole pine timber type. More specifically, lodgepole pine management policies provide for regulated utilization of the post and pole resource and establishment of an area regulated acreage base for sustained yield post and pole production.

(2) Silviculture - That portion of the lodgepole timber type established for sustained post and pole production will be harvested under even-aged management systems. The remaining acreage will be converted to sawlog production once the post and poles are harvested. These areas will be managed using even-aged, temporary even-aged and uneven-aged systems depending on habitat type and stand condition.

3. Goals, Regulation and Policies

a. Management Plan Goals and Objectives - The goals and objectives for management of the lodgepole pine component fall within the scope of the goals identified in Section III. C. More specifc goals and objectives are directed toward establishment of a raw material base for the Confederated Salish and Kootenai Tribal Post and Pole Plant and utilization of the existing post and pole product inventory.

(1) Delineate and commit a specified acreage base from the existing commercial forest to provide a sustained supply of post and pole products.

(2) Insure a steady supply of raw material to

the local post and pole industry through regulation of the harvest.

(3) Using area control methods, regulate that portion of the commercial forest designated for sustained yield post and pole management.

(4) Develop access to the unroaded lodgepole pine component to initiate regulation throughout the entire component during this first ten-year period.

(5) Rehabilitate those lodgepole stands that have no product potential and that presently contain no products of economic importance.

(6) Create, in time, a multi-species mosaic of size and age classes in the present lodgepole pine component that will significantly reduce the potential for major losses from damaging agents such as the Mountain Pine Beetle.

(7) Implement management practices in the lodgepole component that will provide a wide range of employment opportunities to the local Indian population.

(8) Coordinate lodgepole management practices with all other forest land uses in such a way that adverse impacts will be mitigated as much as possible.

(9) Accelerate the harvest of sawlog size lodgepole stands to minimize economic loss from mortality and vigorously pursue the salvage of both mortality and imminent mortality in all other lodgepole stands.

(10) Develop cultural practices and other management techniques that will provide for the production of desirable post and pole products on a short rotation.

(11) Develop alternative funding sources for post harvest/stand rehabilitation activities in Forest Development. Add-On funding ends in 1989.

(12) Complete the lodgepole pine inventory.

b. Regulation

The objective of regulation in the lodgepole pine timber type is to insure method and order in the harvest of the existing forest. The regulation scheme is two-fold. Harvest regulation of posts, poles and sawlogs must be manipulated to treat a requisite number of acres while meeting the objective of providing a steady supply of raw material to the Tribal post and pole plant.

Flathead Post and Pole Yard, a Tribal enterprise.

An area-regulated acreage base for sustained yield post and pole production will be developed from portions of the existing lodgepole pine timber type and portions of the even-aged and temporary even-aged commercial forest. In the process of development of this area-regulated acreage base a combination of volume regulation and acreage regulation will be necessary.

(1) Conversion Period

A detailed discussion on the conversion period is contained in Appendix D of the

Flathead Reservation Inventory Analysis. Site potential, present and projected volume in post and pole size trees, and present and projected demand for post and pole products are evaluated to support a conversion period of 40 years.

The estimates of site productivity and the resultant length of the conversion period may be very conservative. It is conceivable that, under intensive management, the potential productivity could be two to three times higher than the current estimate of 1,200 posts/acre, and be accomplished on a rotation period shorter than the present estimate of 40 years. The net effect of an increase in the productivity estimates would reduce the acreage requirements to meet projected demand while shorter rotations would increase the present allowable cut. Within the next ten years, it is planned to acquire information on which to base our calculations. However, the local post and pole industry should use the present estimates to guide their planning for the interim period. When this document is revised in 1991, new information should be available that would allow the Tribal post yard to make longer range projections with greater accuracy.

(2) Allowable Annual Cut (AAC)
A detailed discussion on the AAC is contained in the Flathead Reservation Inventory Analysis for the Management Period 1982-1991 and summarized in the summary section of this plan. The important aspect of the AAC is the regulatory function that it plays in the management of Flathead Reservation lodgepole pine. An AAC is calculated for both fence posts and for sawlogs, but only the AAC for fence posts has any regulatory function. The rate at which the lodgepole component is harvested will be governed in part by the harvest of post and rail type products, and in part by the acreage regulation function described in the next section. The annual harvest of saw timber from the lodgepole pine component will generally be a consequence of post and rail harvest and not a regulated harvest. The only exception to this will be the board foot volume harvested from stands where

posts and rails are economically insignificant and the acreage is not part of a designated Post and Pole Management Area. This volume will be harvested as the five year timber sale plan and silvicultural priority dictates.

(3) Acreage Regulation
The objective for the end of the conversion period is a regulated component of the forest committed to post and pole production and managed using strict area control methods. At the end of the conversion period this area will be comprised of 40 age classes occupying 375 acres per age class and totaling 15,000 acres. To achieve this objective during this first 40 year conversion period, 375 acres within Post and Pole Management Areas need to be regenerated each year. Harvest outside a Post and Pole Management Area will be unregulated in that no specific number of acres or volume will need to be harvested annually outside the Management Areas. This unregulated harvest will be accomplished to meet the demand for post and rail products that can't be met by harvesting within Post and Pole Management Areas.

(4) Regulation Policy
It will be the policy of harvest regulation to meet the combined objectives of providing employment opportunities and raw material to the Tribal post and pole plant within the guidelines of the regulation regime presented here. Harvest regulation has an intrinsically theoretical basis. It is recognized that the economic realities of the present post and pole industry require that harvest regulation be phased in and not abruptly replace the present system of unregulated harvest. The details of harvest regulation, described in the next section, have been developed within this framework.

Implementation of harvest regulation is critical to long range success. Failure to implement the regulation scheme will create imbalances and major fluctuations in availability of a sustainable supply of raw material for the local post and pole industry. Over-cutting or under-cutting of either volume or acreage will alter the end result. Before any conscious under or over-cutting of either acreage or volume is undertaken, an analysis of consequences should be made. If a decision is made that alters the regulation scheme, the management objectives should be changed to reflect the end result.

c. Lodgepole Management Policies

The forest management policies discussed in the body of the Forest Management Plan are the framework for management of the lodgpole pine timber types. Management policies contained herein are specific to management of the existing lodgepole pine timber types in the commercial forest base. In general, lodgepole management policies concentrate on utilization of the existing post and pole inventory and implementation of the regulation scheme discussed in the previous section.

(1) Overall Planning

The lodgepole pine timber types will be grouped into geographical units similar to timber sale units and will go through a similar planning process as a major timber sale.

(a) Post and Pole Management

That portion of the existing lodgepole pine timber type that is suitable for post and pole production will be designated as a Post and Pole Management Area. Silvicultural prescriptions for sustained yield post and pole production will be implemented on these areas.

The criteria for a post and pole production area involves slope, habitat type, accessibility, present stand condition and acreage suitable for management under an area control system.

i. Slope - Average slopes of 25 percent are preferred to provide for future mechanized felling and bunching operations. Slopes up to 40 percent are acceptable when necessary to block up a post and pole production area.

ii. Habitat Type - Habitat groups D, E and F as defined in Section

iii. Stand Condition - In habitat group D, the present stand condition frequently precludes an even-aged harvest for post and pole products. Lodgepole seldom occurs as a dominant species in this group and frequently the silvicultural prescription is a commercial thin for post and poles. If present stand condition has more potential for future sawlog management the area should not be included as part of a Post and Pole Management Area.

iv. Accessibility - Must be roadable and in the commercial forest base.

v. Acreage Suitability - Sufficient acreage should be included in a Post and Pole Management Area to allow efficient area control. The emphasis will be on blocking up an area to concentrate the activity and minimize the number of roads. The area should be large enough to include four separate entries over the conversion period. To accomplish this, the minimum acreage included in a Post and Pole Management Area will be about 200 acres.

(b) In the Remainder of the Lodgepole Timber Type

Management of the harvest will be primarily concerned with salvage of the existing post and pole products. The acreage treated in these stands is not a limiting factor. The posts on these areas will be harvested, primarily to make up deficient volumes resulting from regulated harvest in the Post and Pole Management Areas. The stands that have primarily sawlog volume will be removed from the scope of this plan and receive treatment based on stand priority within the regulation constraints of the Forest Management Plan.

(2) Scheduling Harvest and Stand Rehabilitation

In general, the trend of the post and pole harvest during this 40 year conversion period will start in stands of good volume posts and poles on gentle terrain and end in the more difficult terrain and lower volume stands. Initially, most volume will be harvested from good post and pole volume stands resulting in less acres harvested than the regulation goal of 375 acres. This acreage deficiency will be made up by rehabilitating other stands and harvesting sawlog stands in post productive areas.

As the harvest progresses through this first 40 year conversion period and volumes per acre drop, more and more acres will need to be harvested to meet raw material needs. Eventually the needed volume will come from stands on steeper terrain outside the designated Post and Pole Management Areas.

Managing the harvest through the 40 year conversion period will require careful planning and close regulation of the harvest. This will help insure that the existing post and pole inventory lasts 40 years and we arrive at an area regulated component at the end of the conversion period.

(3) Multiple Use Aspects of the Lodgepole Component

During the alternative selection process referred to earlier, the Tribes decided to implement timber management practices on the entire commercial lodgepole component. However, the Tribes may wish to change these objectives and reserve areas from timber management as it did by establishing the Jocko Primitive Area and the Tribal Mission Mountain Wilderness Area. Other foreseeable uses such as mineral development may prevent the use of an area for post and pole production. It is also recognized that impacts of post and pole production on other uses such as wildlife or water may not be acceptable, and therefore lead to permanent removal of such land from the scope of this plan.

In addition to the post and pole resource the lodgepole ecosystems on the Reservation have watershed, wildlife, recreation and aesthetic values. Lodgepole pine stands occupy the upper reaches of several watersheds including Mill Creek, Seepay Creek, Revais Creek, North and South Forks of Valley Creek, the Jocko River and several others. Lodgepole stands serve as summer range for several species of non-game wildlife. Extensive stands of lodgepole pine are visible from most areas on the Reservation and their visibility is important to recreational and aesthetic values. Management for the lodgepole component takes all values into consideration and silvicultural presciptions aimed at wood production will prescribe specific actions to mitigate the impact on other uses.

d. Silvicultural Prescriptions

Silvicultural prescriptions in the Section III.F. serve as a framework for silvicultural prescriptions specific to management of the lodgepole timber type.

(1) Stand Examination

Stand examinations have been done on approximately 84 percent of the lodgepole pine timber types. Initial groupings of stands for post and pole production and sawlog production will be done from the results of these stand examinations. Specific silvicultural prescriptions will be developed for stands within the lodgepole component after thorough stand reconnaissance.

(2) Stand Condition Analysis

Stand condition will be a major consideration in determining which stands within a group of lodgepole stands are to receive priority treatment. Factors to consider in stand condition include insects and disease, dwarf mistletoe and species composition. In general, the prescription will balance the need to produce volume with the need to enter stands needing a silvicultural treatment.

(a) Mountain Pine Beetle

The most serious insect threat to lodgepole pine is the Mountain Pine Beetle (*Dentroctronus ponderosae*), which can kill almost all merchantable trees in a stand during a single infestation. Recent infestations in the northern Rocky Mountains total 1.5

million acres. It is certain that we will have to deal with the Mountain Pine Beetle during the next 10 year management period.

Mountain Pine Beetle epidemics in lodgepole pine forests are predictable and are dependent upon a stand developing conditions conducive to build-up of beetle populations. Epidemics are most likely in uniform stands of large diameter (10") trees. All predominately sawlog stands on the Reservation are highly susceptible, and many pole stands are rapidly approaching those conditions that favor Mountain Pine Beetle build-up. Almost all lodgepole pine stands eventually suffer heavy mortality from Mountain Pine Beetle if the conditions conducive to a population build-up are not changed.

In developing silvicultural prescriptions for a group of stands, the presence of beetle activity and the relative likelyhood of a beetle outbreak will be assessed.

Priority treatment will be given to stands that have the capability of build-up and/or sustaining outbreak levels of Mountain Pine Beetle populations. The reader is referred to "Theory and Practice of Mountain Pine Beetle Management in Lodgepole Pine Forests - Symposium Proceedings" (Berryman, et al. 1978).

(b) Dwarf Mistletoe

Dwarf mistletoe (*Arceuthobium spp.*) is present in about one-third of the lodgepole stands on the Reservation. It reduces height and diameter growth, decreases seed production, reduces wood quality and cause mortality in heavily infected stands. Studies in virgin stands showed that heavily infected stands had about half the volume of those that were not infected. Stands heavily infected by dwarf mistletoe are also more susceptible to bark beetles and other diseases. Clearcutting and regeneration of disease-free stands is the most effective control method.

Silvicultural prescriptions in dwarf mistletoe infected areas will give priority to designing cutting units that protect established regeneration from infection. Old growth, mistletoe infected stands, will also be given priority for treatment.

(c) Rusts

Stem cankers and rusts are common in Reservation lodgepole stands and are significant because they reduce the quality and merchantability of individual trees. Silvicultural prescriptions for stands with rust infections will consider two options to deal with the problem.

i. Clearcut the infected stand and regenerate to a mix of major seral species for the habitat type. In a post production area special consideration will be given to species with desirable growth characteristics for post and pole products.

ii. On wet sites and lower elevations where infections are frequently the most severe, consideration will be given to favoring non-host species and managing the area for sawlog production instead of post and pole production.

(3) Post and Pole Versus Sawlog Management

In habitat groups D and E, other seral species are likely to be a component in the stand. The condition of these other species is important in determining the stand's conversion to permanent post and pole production. Things to consider are percent composition by species, insect and disease, dwarf mistletoe occurrence, vigor, crown ratios and age.

In habitat group D, if the present stand condition requires temporary even-aged treatement, the area is to be considered for post and pole production. If the non-lodgepole pine component is suitable for uneven-aged management then the area should be excluded from a post and pole management area.

In habitat group E, the other species in the stand will be analyzed for suitability in carrying to rotation age. If the stand is primarily sawlogs, consider delaying harvest until later in the conversion period and put into post and pole production at that time. If the stand is primarily post and poles, the non-lodgepole component must constitute a stocked stand to delay or remove the area from post and pole consideration. The silvicultural prescriptions in Section III. F., are a guide in making this decision.

(4) Post and Pole Management Areas

(a) Silvicultural Method

Posts and pole products will be produced on a tentative 40 year rotation using even-aged management systems.

(1) Clearcut will be the preferred regeneration system as lodgepole is frequently not wind-firm and is not a reliable seed tree because of its variable cone serotiny.

(2) Seed tree cuts may be suitable in some cases where western larch seed trees are available. Seed trees must be of cone bearing age as evidenced by the presence of old cones on the tree. A maximum of 5 seed trees per acre will be reserved to insure that western larch does not become the major component of the regenerated stand.

(b) Block Size

Limitations will be the same as those prescribed in the main body of the Forest Management Plan.

(c) Logging Methods

Logging methods employed in the harvest of sawlog lodgepole are identical to those for small sawtimber harvest elsewhere on Reservation timber lands.

Logging methods employed in the harvest of post and poles is in the process of change. The past practice of cutting "post-roads" into lodgepole stands to provide pick-up access is declining as terrain suitable for this method becomes limited. Increased use of rubber-tired and crawler tractor skidding systems has greatly expanded the harvest opportunities in posts and poles. Silvicultural prescriptions for the harvest of posts and poles must deal with both types of harvest methods. The past practice of using "post-roads" for access needs to be provided for as long as there is suitable terrain.

Recent mechanized harvest methods practiced by local post cutters raises concern over their impact on site productivity. When post and pole size timber is harvested with conventional tractor skidders many more "turns" are required to move the large numbers of pieces per acre. This situation is aggravated when the equipment lacks specialized winches and makes it necessary for the skidder to back up to each "turn". The net result is that essentially every square foot of the area is covered several times by skidding equipment. Recent studies have shown that this type of harvest method can adversely impact soil structure, seriously reducing site productivity. Silvicultural prescriptions anticipating this type of skidding need to consider this possibility and prescribe mitigating actions when necessary.

The practice of whole tree yarding is also becoming increasingly popular. This practice may be undesirable from several aspects. In serotinous cone stands, the seed source is removed when the tops are skidded to a landing area. This may increase regeneration costs by increasing the need for more artificial reforestation. Secondly, logging slash helps to modify harsh site conditions. Complete removal of logging residue on harsh sites may lead to regeneration problems. A third aspect to this practice is the removal of organic matter available for soil development. Organic matter is critical to mycorrhizae and moisture retention. Many nutrients essential for tree growth, are contained mostly in the organic matter. Hence, conservation of organic matter is essential to the maintenance of site productivity. Silvicultural prescriptions will need to address this practice and modify it as necessary where the impact is considered unacceptable. Generally, whole tree skidding will not be permitted on sites with soils in Soil Groups 6, 19, and 25 (University of Montana, 1984).

Slopes in post management areas will be limited to a maximum of 40 percent. This does not preclude the use of cable yarding systems and in fact may be more desirable for harvesting this type of material. Some cable yarding systems available are less expensive to operate than conventional skidding equipment and have the least impact on long term harvest of posts and poles. When they are introduced they will greatly increase the flexibility in the harvest prescription.

(d) Rehabilitation

When the volume is insufficient to support an economical harvest operation, and the trees are growing too slowly to reach a usable size in a reasonable time, some type of rehabilitation will be necessary. A subsidized harvest operation with subsequent slashing of the remaining material is one alternative. In the event that there are no products to salvage a stand replacement treatment will be prescribed.

The exact method by which a stand will be treated has not been fully developed. Presently, it is felt that laying the stand down, combined with piling and/or burning would be effective. A more efficient method will be developed as more of this is done.

Pre-commercial thinning would be another alternative where stand conditions permit. The objective of thinning would either, (1) increase the volume in post and rail size trees 20 to 40 years hence or, (2) set the stand up for a sawlog harvest near the end of the conversion period.

(e) Regeneration Prescription
Natural regeneration will be prescribed whenever possible. Seeding may be used when necessary to supplement natural regeneration.

i. Species Composition - Growth rate and form are important to production of post and pole products. Lodgepole pine and western larch have the desirable growth characteristics. A mix of these species is considered desirable, where possible, to minimize the risk generally associated with mono-cultures. Post and pole production areas in habitat groups D and E will be targeted for at least 75 percent lodgepole pine with the balance in western larch and other seral species. Habitat Group F is above the limits of western larch and essentially pure stands of lodgepole will have to be acceptable.

ii. Site Preparation - Lodgepole pine and western larch both require mineral soil seed beds for prompt establishment. Dozer scarification and/or piling will be the standard treatment in post and pole production areas. Dozer scarification will be preferable to piling where hazard reduction is not a concern. The logging debris left scattered across the area can serve as as seed source in the case of lodgepole pine and enhance micro-site availability for prompt seedling establishment.

Broadcast burning may be used as an alternative when feasible, and when slopes, fuel loadings and silvicultural prescription can justify it.

iii. Stocking Standards - Guidelines for post and pole production on a short rotation are not currently available. The objective is to maximize the number of post and rail products per acre. To do this, the trees need to have as high a form class as possible while attaining merchantable tree diameters of five to six inches dbh at a 40 year rotation age. Observations of natural stands combined with intuitive judgment suggest that 1,200 crop trees is an acceptable balance between growth and form. To allow for natural mortality and have the opportunity to do some selection for crop trees requires more seedlings at stand establishement. Therefore, 2,000 trees per acre at stand establishment will serve as an interim guide until more precise standards are developed.

(5) Remainder of the Lodgepole Component
Sawlog production will be the management objective while the silvicultural prescriptions will be designed to harvest existing post and pole products from these areas. Prescriptions contained herein are specific to that end and the reader is referred to sawlog production prescriptions in Section III. F. for more information.

(a) Harvest Methods
Sawlog management areas within the lodgepole timber type will generally be on steeper terrain. A significant portion of the existing post and pole inventory is on this terrain and is currently not being harvested because suitable harvest methods are not being employed. The next 10 year management period must see a cable yarding system put into practice in the harvest of posts and poles. Harvest of these products are essential to attainment of the long range objectives for post and pole management. Some research and development on small, economical cable yarding systems has been done. The major obstacle to overcome is to adapt one or more of these systems to local conditions and get them into use

by local postcutters.

(b) Rehabilitation
Rehabilitation of no-product stands on steeper terrain is limited at present to thinning or slashing and broadcast burning. Pre-commercial thinning of these stands will be prescribed when stand conditions warrant it. The primary objective of thinning would be to reduce stocking to maximize sawlog production or, if possible, bring enough trees into post and rail size to make harvest of these products feasible.

(c) Silvcultural Method
i. Even-aged - Post and pole stands in habitat groups E and F will be harvested using some form of even-aged treatment. Block size limitations, seed tree requirements and site preparation treatments are prescribed under even-aged systems in Section III. F.

ii. Temporary Even-aged/Uneven-aged
Stands in habitat group D may be commercially thinned for posts and poles and subsequently managed under uneven-aged systems.

4. Action Plan
a. Harvest Regulation
(1) Regulated Versus Open Cutting
Lodgepole pine stands will be grouped into regulated and unregulated cutting areas. All Post and Pole Management Areas will be managed under a regulated harvest regime as will all sawlog harvest. Outside Post and Pole Management Areas, regulated harvest will be used to keep cutting units within prescribed size limitations, administer the use of mechanized harvest methods and meet regulation objectives as needed. Unregulated cutting areas will be provided for the occasional cutter as long as Tribal policies so dictate. Unregulated cutting will be limited to pick-up and chainsaw operations and will not be permitted within any regulated cutting areas.

(2) Administration
The harvest of posts, poles and sawlogs

will be administered through a combination of free-use permits, paid permits and timber sale contracts.

(a) Free-use Permits
Free-use permits will be issued for harvesting posts and poles. Regulations will differ depending on the prescription and will be updated through Tribal Council action as the need arises.

(b) Paid Permits and Small Timber Sales
Paid permits will be used for the harvest of any sawlog volume.

(c) Large Timber Sale Contracts
Large timber sales may include extensive areas of lodgepole. Silvicultural presciptions for lodgepole stands will insure that any entries made as a result of a large timber sale will be consistent with lodgepole management policies.

(3) Scheduling

(a) Regulated post and pole harvest areas will be scheduled while considering stand condition, economic viability, coordination with the Five Year Timber Sale Plan and geographic distribution criteria. The demand from the Tribal post yard and accomplishment of regulation objectives will determine the number of regulated harvest areas open at any one time.

(b) Most sawlog sales will be scheduled using criteria identical to those contained in the Sales Policy section of the main body of the Forest Management Plan. Some sawlog harvest will be scheduled solely to meet regulation objectives for post and pole management.

(c) A five year harvest/rehabilitation schedule will be prepared and updated annually. It will schedule the development, and harvest in Post and Pole Management Areas. Both sawlog harvest and post and pole harvest will be scheduled. It will also schedule all site preparation, regeneration and stand rehabiliation work within Post and Pole Management Areas. It will schedule an annual 375 acre treatment within Post and Pole Management Areas, and provide sufficient post and pole volume to meet the demand from the Tribal post yard.

(d) The lodgepole management forester will be involved in scheduling large sales where there are lodgepole timber types. The lodgepole management forester will schedule and coordinate with the forest development section on all site preparation, reforestation or stand rehabilitation work within the lodgepole type.

He will also coordinate with the fire management section on aspects of lodgepole management involving fire, and is also responsible for coordination with all interests outside of forestry, i.e. Tribes, wildlife, recreation, etc.

5. Funding Lodgepole Management Activities

Currently almost all lodgepole management activities involving post harvest treatments are funded with Federal Forest Development Add-On funds specially appropriated to take care of a national backlog of timber stand improvement/reforestation work. These monies are scheduled to end in 1989.

Timber stand improvement work will be needed in future intensive management activities for sustained post and pole production. There is currently no source of funding for this type of work. Alternative funding sources need to be developed early during this first 10 year management period.

Several alternatives exist but, in general, they entail the Tribes taking more responsibility. Options to consider should include assessing a timber stand improvement fee on currently free-use material and/or requiring the Tribal post yard to set aside a portion of its profits to fund cultural practices on areas managed to provide their future supply of raw material.

6. Access

An estimated 150 miles of road is required to access the existing commercial lodgepole timber type. Approximately half is required to accomplish the goals of this first 10 year management period and the remainder will be required to complete the harvest and meet regulation objectives by the end of the conversion period.

In general, policies on road location, standards and road closure are addressed in Section IV.C. and D. Specific considerations in construction of roads for post and pole harvest will consider the access needs for post cutters using the traditional "pick-up and chainsaw" harvest method. When the terrain is suitable for this type of harvest, access ramps through fill slopes and cut slopes will be provided to allow cutters to take their pick-ups into the stand via "post-roads".

Construction of access roads will be accomplished in many ways. Access will be developed during large timber sales, accessing small lodgepole sales or built to access post and pole stands by a number of organizations including the Confederated Salish and Kootenai Tribal Post and Pole Yard, post cutters, Kicking Horse Job Corps Center or Branch of Forestry, Bureau of Indian Affairs.

7. Inventory

The original inventory of the lodgepole component was done during 1977 - 1979, that inventory formally surveyed 26,810 acres. Approximately 5,400 acres of the lodgepole timber type needs inventory work. This inventory will be completed during the first half of this 10 year management period. The tentative objective is to inventory about 1,000 acres per year.

Toward the end of this 10 year management period some form of update will be required on the existing inventory to verify projected growth and mortality estimates done in preparing this plan.

8. Productivity Estimates for Posts and Poles

The productivity estimates for post and pole production are based on natural stands. Current estimates of 1,200 posts per acre in 40 years is considered conservative and it is not known what actual yield might be under intensive management.

Initial stocking guides of 2,000 seedlings/acre five years following harvest is only an interim guide.

Intensive management for post and pole production may possibly double or triple projected yields, but reliable information is not currently available. An intensive study of growth and yield for the production of post and pole products will be initiated early in this 10 year management period. It is hoped that by the time the management plan is revised, more reliable estimates of actual yield will be available.

9. Record Keeping

An essential part of area control regulation is an accurate record keeping system that can track the harvest of the existing inventory and track the development of each individual age class.

A depletion schedule will be updated annually and accurate records kept to summarize the harvest to date and project that which remains. The present "pre-treatment card system" will track and provide harvest data.

A record of each stand will be kept so that its development can be monitored and cultural work programmed. An ADP system will be developed that is compatible with the present system used to track the even-aged harvest in the sawlog component of the commercial forest.

K. Photopoint Program

One of the most effective methods of showing changes in vegetation is by comparing photographs. Some of the changes in the Reservation forests worth recording are forest growth, effects of wildfire, timber harvesting, precommercial thinning, and results of disease and insect outbreaks. By periodically rephotographing a forest area, such changes may be readily observed.

A photopoint system was established on the Flathead Reservation forest land in 1975 to accomplish this goal. A photopoint is a permanent point where photographs are taken at 5 year intervals. By duplicating the time, kind, size and direction of photograph, the compared photos will clearly show changes that have occurred.

An outline and explanation of the procedures for this program are contained in the Presales Handbook, located in the BIA Branch of Forestry Office.

APPENDIX A

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APPENDIX B

GLOSSARY

Accretion - An increase or addition of growth increment in diameter or volume, of trees during a specified period of time.

ADP (Automatic Data Processing) - Refers to an electronic procedure using computer programs to analyze forest data and provide statistical information.

Aesthetics - Evaluations and considerations concerned with the sensory quality of resources (sight, sound, smell, taste, and touch) and especially with respect to judgement about their pleasurable qualities.

Age Classes - Intervals (commonly 20 years) into which the age range of a timber stand is divided; also the trees falling into such an interval.

Allotment - Lands held in trust for an individual or group of Indians.

Allowable Annual Cut (AAC) - The amount of timber considered for cutting during a one year period of operation under specified principles of periodic or sustained yield management.

Backlog - An accumulation of needed, but unfulfilled forest development work such as thinning or reforestation.

Basal Area (BA) - The area of the cross-section of a tree stem near its base, generally at breast height and inclusive of bark.

Blowdown - Trees blown over by high winds, known also as "windthrow".

Board Foot - A unit of solid wood, one foot square and one inch thick.

Broadcast Burning - Allowing an intentionally set, but controlled fire to burn over a designated area within well-defined boundaries to reduce fuel hazard, prepare the site for reforestation, and accomplish other management goals.

Burning Window - A period of time measureable by hours or days during which favorable fuel and weather conditions exist for conducting prescribed - controlled burns.

Chain - A standard length of measure equal to 66 feet (one chain).

Cleaning - See "Release Cuttings".

Clearcut - An area from which all trees have been removed by cutting.

Climax - The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition.

Codominant - A tree with its crown in the general level of the canopy receiving full light from above, but comparatively little from the sides.

Commercial Forest Land - Forest land capable of producing at least 15 cubic feet per acre per year of merchantable timber, currently or prospectively accessible to timber harvest and not withdrawn from such use.

Commercial Thinning - Any type of thinning producing merchantable material at least equal to the value of the direct costs of harvesting.

Continuous Forest Inventory (CFI) - A type of forest inventory using permanent plots which yields forest-wide growth and volume in information.

Conversion Period - (or adjustment period) The number of years required to convert an undeveloped forest to a partially or fully regulated condition consisting of proper stocking and distribution of age and size classes. For the Flathead Reservation the period is 40 years beginning in 1982.

Cover Type - The predominant living vegetation which is currently growing on the land. It generally refers to individual tree species or associations of them, but can include brush and grass types.

Crop Tree - Any tree forming, or selected to form, part of the final crop; generally a tree selected in a young stand for that purpose, also called Management tree.

Crossing (genetic) - The fertilization of the female gametes of one individual by the male gametes of another, whether in nature or artifically and/or the ability or relative success in obtaining viable seed from cross-pollinations (hybrid).

Crown Ratio - The ratio of a tree's crown length to the tree height.

Cruise - An inventory used to estimate the quantity of timber on a given area according to species, size, quality, possible products or other characteristics.

Cubic Foot - A unit of volume measure forming a cube of one-foot sides.

Cultural Treatment - A general term for silvicultural operations undertaken to assist or complete tree regeneration, to promote the development of a forest crop, and to minimize damage caused by felling and harvest activities.

Cummulative Impacts - An increase in influence or effect of some successive action(s), be it related or unrelated, upon something else.

Cutover - Forest area which has had some or all of its trees and cut down and/or harvested.

Cutting Cycle - The planned, recurring lapse of time between successive cuttings in a tree crop or timber stand. This is generally 20 years for the Flathead Reservation.

Decadent - Deteriorating; when used in reference to stand condition there are inferences of mortality of trees from the overstory and of the presence of disease, or indications of loss of vigor in dominant trees.

Defect - In timber, any feature that lowers its utility and or commercial value.

Diameter Breast Height (DBH) - The diameter of a tree measured at a point 4.5 feet above ground level on its uphill side.

Disturbance - An intrusive factor which causes some change to forest site conditions and or forest stand (ie: wildfire, road building, grazing, lightning strike, insect epidemic, strong wind, disease and erosion).

Diversity - The relative degree of abundance of plant-species, wildlife species, communities, habitats, or habitat features per unit of area.

Dominant - Trees with crowns extending above the general level of the crown cover and receiving full light from above and partly from the side, larger than the average trees in the stand and with crowns well developed but possibly somewhat crowded on the sides.

Duff - The combination of forest floor litter and the less decomposed humus on the forest floor.

Dwarf Mistletoe - A plant which is parasitic on forest trees and other woody plants.

Ecosystem - An interacting natural system included all the component organisms together with the physcial environment.

Ecotone - The area influenced by the transition between plant communities _or_ between successional stages _or_ vegetative conditions within a plant community.

Easement - A right or privilege that a person may have in another's land, such as a right-of-way passage through a person's property.

Endangered Species - A wildlife species officially designated by the U.S. Fish and Wildlife Service as having its continued existence threatened over its entire range because its habitat is threatened with destruction, drastic modification, or severe curtailment, or because of over-exploitation, disease, predation, or other factors.

Endemic - Native or confined to a certain region; having a comparatively restricted distribution.

Entry - Generally refers to a period of cutting within a forest, crop or stand.

Environmental Assessment (EA) - A document which provides sufficient analysis for determining whether a proposed action may or will have a significant impact on the quality of the human environment. If the proposed action may or will have significant impacts, an EIS is prepared. If the EA reveals no significant impacts, a FONSI (Finding of No Significant Impact) is prepared.

Environmental Impact Statement (EIS) - A document which reports on significant environmental effects for major federal actions, and which includes public and governmental agency comments; a formal legal document used as a basis for judicial decisions concerning compliance with public law. (National Environmental Policy Act PL 91-190, 1970).

Environment - The sum total of all the external conditions that may influence organisms.

Ephemeral Stream - A stream which flows only after rains or during snow melt.

Epidemic - Populations of plants, animals and viruses that build up, often rapidly, to highly abnormal and generally injurious levels.

Erosion - The combined action of weathering, ablation, deflation, and abrasion on land surfaces.

Even-aged - A forest, crop or stand composed of trees having no, or relatively small differences in age.

Extensive Forestry - The practice of forestry on a basis of low operating and investment costs per acre.

Eyrie - The nest of an eagle or other bird of prey.

Finding of No Significant Impact (FONSI) - A document by a Federal agency briefly presenting the reasons why an action will not have a significant effect on the human environment and for which an Environmental Impact Statement therefore will not be prepared. This document accompanies the Environmental Assessment.

Forage - The edible vegetation for livestock and/or wildlife, produced seasonally or annually on a given area.

Frost Pocket - A description of a particular terrain location where frost occurs frequently.

Fuel loading - The amount and composition of fuels expressed in either tons per acre or cubic feet per acre.

Fuel - Any substance or composite mixture susceptible to ignition and combustion.

Fuel Management - The manipulation of fuels to accomplish objectives of management, usually to reduce the risk of damage from wildfire.

Geomorphic - Of or pertaining to the figure of the earth or the forms of its surface.

Goal - A consise statement that describes a desired condition to be achieved some time in the future. A goal is usually not quantifiable and may not have a specific date for completion. Goal statements form the principal basis from which objectives are developed.

Group - Selection (System) - A regeneration system which is a modification of the selection system, in which trees are removed in small groups.

Ground cover - Herbaceous plants, including grasses and ferns, and the lowest shrubs occupying an area.

Growing Stock (Level or Index) - All the trees growing in a forest or in a specified part of it, generally expressed in terms of a number or volume. Stand density expressed as a growing stock index - or the basal area per acre (in square feet) that a given stand may be expected to attain at a specific index age.

Guideline - A statement of policy or conduct.

Habitat - The sum total of environmental conditions of a specific place occupied by a plant and/or animal species or a population of such species.

Habitat Type - The aggregate of all areas that support, or can support, the same primary vegetative climax; a classification of environmental settings characterized by a single plant association.

Hazard Reduction - A management action designed to reduce risk from a recognized combination of factors that may lead to injury or economic loss.

Herbaceous - Having little or no woody tissue and generally persisting for more than a single season.

Herbicide - A chemical substance used for controlling plant growth.

Hiding Cover - Vegetative cover that shields an animal from view (site or secret cover).

High Risk - A general term referring to an individual tree, forest or stand whose poor condition and vigor indicate a chance of death within a defined time period.

Hydrology - The study of the circulation of water in and between the atmosphere and the earth's crust, with particular emphasis on the phases initiated by precipitation and ending with evapo-transpiration.

Improvement Cut - A cut performed in either even- or uneven-aged stands where the released trees are of pole size or larger.

Increment - The increase in girth, diameter, basal area, height, volume, quality, or value of individual trees or crops over a specified time, usually annually.

Ingrowth - The number or net volume of trees that were less than the minimum merchantable size at the start of the CFI measurement period, but which have grown to a size equal to or above that minimum limit during the period.

Initial Attack - The first wildfire supression response.

Intensive Forestry - The practice of forestry to obtain a high level of volume and quality of wood products per unit of area; accomplished through the application of the best techniques of silviculture and management.

Intermediate Cuttings - Any removal of trees from a regular crop or stand between the time of its formation and the harvest cutting (includes: thinnings, improvement cuttings, salvage and sanitation cuttings).

Jackpot Burning - The burning of concentrations of forest fuels.

Kelly Humps - A form of road blockade created by a ditch across it with a mound of earth adjacent to the ditch across the road width.

Land Stratification - The classification of the landscape into similar and distinct types (ie: Evergreen stands, hardwood stands, swamps, talus fields, rivers and lakes).

Land Unit Planning - The process of categorizing land units for various kinds and intensities of use and management.

Let Burn - A determination to allow a wildlife to burn unrestricted or uncontrolled, providing it is not threatening life and personal property.

Liberation Cutting - See "Release Cuttings".

Limited Management Area - This area consists of commercial forest sites having marginal productivity, or fragile soils, or where timber yield is significantly reduced by other values.

Line Skidding - Moving logs to a road or landing using cable attached to a stationary yarding machine.

Lopping and Scattering - A form of slash treatment whereby one or more branches of a tree, whether standing, felled or fallen are cut and dispersed about the site.

Management Tree - See Crop Tree.

MBF - An abbreviation which stands for "one thousand board feet" of timber.

Mechanical Scarification - Exposing mineral soil by machine action, in preparation for regenerating by direct seeding or natural seedfall.

Merchantable - (trees) - Trees that can be marketed.

Metamorphose - To change in form or nature; transform.

Microsite - A small environment within a more general habitat that is uniquely distinct.

Mitigate - To make or become milder, less severe, less rigorous, or less painful; moderate.

MMBF - One million board feet.

Model - A mathematical representation of the forest or a forest system, such as the Growth Prognosis Model.

Mortality - The loss to a population (ie: a forest or herd) from all lethal causes (ie: hunter kill, disease, accident, predation and poaching).

Multiple Use Management - A concept of land management in which a number of products are deliberately produced from the same land base; in the National Forests, the simultaneous provision of water, wood, recreation, wildlife is required by the Multiple Use Sustained Yield Act.

Natural Regeneration - Renewal of a tree crop by seeds falling from trees in the vicinity.

Needle Complement - The relative number of needles per branch.

Objective - A concise time-specific statement of measureable planned results that respond to pre-established goals. An objective forms the basis for further action planning that defines precise steps to be taken and resources to be used in controlling work to be done to achieve identified goals.

Old Growth Stand - A stand that is past full maturity and showing decadence.

Overstory - The portion of the trees that forms the uppermost canopy layer in a forest of more than one story.

Parent Material - The unconsolidated, chemically weathered mineral or organic matter from which the upper layers of soils develop.

Phenotype - An organism as observed, ie: as judged by its visually perceptible characters resulting from the interaction of its genotype with the environment.

Phenotype Selection - The choosing of individuals or populations based upon desireable characteristics to obtain genetic improvement.

Pheromone - Insect-produced chemicals that stimulate a specific reaction by the receiving individuals; ie: sex attractants.

Photosynathates - The chemical carbohydrate energy products produced by plant photosynthesis.

Policy - A guiding principle upon which is based a specific decision or set of decisions.

Precommercial Thinning - A felling made in an immature crop or stand in order primarily to accelerate growth and improve the average form of the trees that remain.

Prescribed Burning - The skillful application of fire to natural fuels under conditions of weather, fuel and soil moisture, etc., that allows confinement of the fire to a predetermined area and produces the intensity of heat and rate of spread to accomplish planned benefits to one or more objectives of silviculture, wildlife management, grazing, or hazard reduction.

Presuppression - Activities required in advance of fire occurrence to ensure effective suppression action. Includes (1) recruiting and training fire forces; (2) planning and organizing attack methods; (3) procuring and maintaining fire equipment; and (4) maintaining structural improvements necessary for the fire program.

Primitive Area - A land classification of essentially unmodified natural environment of a size or remoteness that provide significant opportunity for isolation from the signs and sounds of man and a feeling of vastness of scale.

Progeny - The offspring of a particular tree or a particular combination of one female and one male tree.

Progeny Test - An experiment, usually replicated, to compare the offspring of different parents, or to compare performance of offspring and parents. Usually confined to seedling offspring.

Provenance Test - An experiment, usually replicated, comparing trees grown from seed or cuttings collected in many parts of a species' natural range.

Put To Bed - An expression inferring put-to-rest, leave alone, allow to recover or return to a previous natural state.

Regeneration - The renewal of the tree crop by either natural or artifical means; also the young crop.

Regeneration Cut - Any removal of trees intended to help establish new trees on the site.

Regulated Forest - A forest with a progression of size and age classes such that harvestable trees in approximately equal volume are regularly available for cutting.

Rehabilitation - To restore an understocked stand of timber or otherwise to put the land back into timber production.

Release Cuttings - Freeing a tree, or group of trees, from more immediate competition by cutting, or otherwise eliminating growth that is overtopping or closely surrounding them.

Types: (1) Cleaning - Cutting applied to stands not past the sapling stage - as soon as the stand has passed browse height, but not until the removal cut has been completed. Improve species composition through early genetic selection.

(2) Weeding - Cutting made in a young stand, not past sapling stage, to free the small trees from weeds, brush, chaparral, vines, sod-forming grasses, or other competing vegetation.

(3) Liberation - A cutting that relieves young growth, mainly trees not past the sapling stage, from overhead competition.

Renewable Resources - Resources whose supply becomes available for use at different intervals in time. The use of present supply flows does not diminish future flows and its is possible to maintain use indefinitely provided the use rate does not exceed flow rate.

Residue Management - See fuels management.

Riparian Zone - An area identified by the presence of vegetation that requires free or unbound water or conditions more moist than normally found in the area.

Riprap - Round or broken stone of various sizes placed together to prevent scour by water flow, or to act as a foundation or retaining wall.

Rolling Dip - A drainage feature designed to remove water from the surface of logging roads.

Root Rot - Any decay or disease developing in, and sometimes characteristically confined to the roots or lower stem of a tree.

Rotation - The planned number of years between the regeneration of an even-aged stand and its final cutting at a specified age.

Rotation Age - The age of the even-aged stand when the final harvest cut is made.

Salvage Cutting - The removal and sale of trees that are dead, dying, or deteriorating.

Sanitation Cutting - The removal of dead or damaged trees or trees susceptible to death or damage - usually to prevent the spread of pests or pathogens and so promote forest hygiene.

Sawtimber - Trees fit to yield saw logs or logs that will yield sawn timber.

Scarification - Exposing mineral soil and creating conditions favoring the establishment of tree seedlings through mechanical action.

Scoping Process - The initial step in developing a NEPA document (EA or EIS) in which the cooperating agencies and interested persons are identified and the issues to be addressed are determined.

Security Cover - Vegetation capable of hiding 90 percent of a standing adult elk from human view at less than 200 feet distance. Generally, a minimum of 200 trees per acre, 8 feet tall meets security requirements on forest regeneration units.

Seed-Tree Cutting - Removal in one cut of the mature timber crop from an area, except for a small number of seed bearers left singly or in small groups.

Seed-Tree Regeneration - Regeneration of the stand by the intentional leaving of selected seed trees during the final harvest cut; once the new stand is established, these trees are usually removed.

Selection Cutting - The periodic removal of trees, individually or in small groups, from an uneven-aged forest in order to realize the yield and establish a new tree crop.

Selection System - An uneven-aged silvicultural system; trees are removed individually or in small groups, here and there, from a large area; regeneration is mainly natural and the stand is ideally composed of many age classes.

Shelterwood Cutting - Any regeneration cutting designed to establish a new tree crop under the protection of trees of the old stands.

Sight Cover - See Security Cover.

Sight Distance - The distance at which 90 percent or more of an adult elk or deer is hidden from the view of a human.

Silvics - The study of the life history and general characteristics of forest trees and stands, with particular reference to site factors, in order to provide a basis for practice of silviculture.

Silviculture - The science and art of cultivating forest crops, based on a knowledge of silvics, the theory and practice of controlling establishment, composition, constitution and growth of forests.

Site Index - A measure of forest site class (or relative productive capacity of a forest site based on volume or height of the trees), based upon the height of the dominant trees in a stand at a given age.

Site Preparation - Process where the soil and growth cover is modified to prepare an area for reforestation.

Slash - The residue left on the ground after trees are felled or accumulated there as a result of storm, fire, or silvicultural treatment.

Snow Loading - Snow accumulation on tree crowns, which in conifers can reduce the strength in upper stem portions leading to leaning trees and potential breakage.

Soil Compaction - Compressing soil particles to a less porous condition usually less favorable to plant growth.

Stability - The ability of an ecosystem, when changed from a steady state, to restore itself to its original condition.

Stand - Plant communities, particularly of trees, sufficiently uniform in composition, constitution, age, spatial arrangement, or condition to be distinguishable from adjacent communities; also may delineate a silvicultural or management entity.

Stand Exam - An inspection of a forest stand; a cruise inventory determining species composition, defect, volume, stocking, etc.

Stocking - A general term for the amount of trees in a given area, particularly in relation to the optimum; more precisely, a measure of the proportion of an area actually occupied by trees, in terms of stocked quadrants or percent canopy closure.

Stratification - The storing of seeds in layers in a moistened medium (ie: peat or sand) so as to maintain viability and overcome dormancy for eventual propagation.

Stumpage Value - The value of timber as it stands uncut.

Suppressed (Overtopped) - Trees with crowns entirely below the general level of the tree canopy, receiving no direct light either from above or from the sides.

Sustained Yield - The yield that a forest can produce continuously at a given intensity of management.

Temporary Even-aged - The component of the forest that will be harvested using even-aged methods due to stand conditions such as severe disease. After these stands are regenerated they will be managed using uneven-aged management techniques.

Thermal Cover - Cover used by animals to ameliorate effects of weather (ie: extreme cold or heat); a stand with 70% or more crown closure with trees 5-40 feet tall.

Threatened Species - A species officially designated by the U.S. Fish and Wildlife Service as having its existence threatened in a localized area, such as state or province or lesser area, because its habitat is threatened with destruction, drastic modification or severe curtailment, or because of over-exploitation, disease, predation, or other factors.

Timber Stand Improvement (T.S.I.) - A general term comprising all intermediate cuttings made to improve the composition, constitution, condition and increment of a timber stand.

Travel Corridor - A route followed by animals along a belt or band of suitable cover or habitat.

Tree Improvement - An objective of silviculturists and geneticists to attain faster-growing, more disease-resistant, higher-quality trees.

Turn - Any load of logs brought to a landing or mill in one trip.

Understory - Trees growing under the canopy formed by taller trees.

Uneven-aged - A forest stand managed to maintain an intermingling of trees that differ markedly in age; stands continuously or periodically regenerated, tended, and harvested with no real beginning or end.

Vigor - The health of an individual tree or of a stand.

Visual Quality Objectives (VQO) - The levels of visual impacts for a given landscape. The five VQO's are: preservation, retention, partial retention, modification, and maximum modification.

Water-Barring - A small trench cut across a road surface (its width) which is installed to deflect water off the road surface and thereby reduce the erosion potential.

Weeding - See "Release Cuttings".

Wilderness - Lands designated by law (Tribal ordinance) as wilderness; they are intentionally managed to maintain their primitive character.

Wildfire - An unplanned fire requiring suppression action; a free-buring fire unaffected by fire suppression measures.

Wildlife Habitat - Vegetation and site conditions forming a environment suitable for designated and wildlife species or groups of species.

Yarding - Transporting timber from the point of felling to a yard or landing.

Yield - In forestry, the wood products that are harvested.

APPENDIX C

FOREST HISTORY - SUMMARY OF RESULTS 1972 - 1981

As part of each Forest Management Plan or 10 year Plan revision, a history of forest management is required. In 1977 a book titled Timber, Tribes and Trust documented the forest management history on the Flathead Indian Reservation for the period 1855-1975. Because it extended into 1975 it overlapped the 10 year forest management period by 4 years. In order to synchronize the history with the management period (1972 thru 1981) this narrative will begin with 1972 to add continuity and to more fully describe particular events not covered in Timber, Tribes, and Trust.

Past forest management on the Flathead has been described in phases. Beginning in the early 1900's the program was unplanned and responded to settlement demands, a pioneer phase. Beginning in 1945, the date of the first Forest Management Plan, a planning phase began with primary emphasis toward removing the initial harvest of timber. This early effort projected a reduction in the annual allowable cut (AAC) would occur culminating in an AAC of 4 million board feet in 1987. In 1960 a second Forest Management Plan was developed initiating a phase called intensive forest management. This plan, supported by a forest inventory, indicated that the AAC should be 71 million each year reversing the depletion theory of 1945.

JI Diehl sawmill at Camas Prairie, 1948.

The philosophy of intensive management was carried into the third management plan for the 1972-1981 period but was enhanced and known as a period of refinement of intensive forest practices. Implicit in this 1972 Forest Management Plan were specific goals dealing with precommercial thinning, mistletoe control, commercial thinning of large second growth stands, elimination of the reforestation backlog, regulation of the unproductive lodgepole pine stands, habitat typing of the forest property and diversifying the organization to assure opportunities to all Indian loggers.

THE 1972-1981 FOREST MANAGEMENT PLAN

The inventory analysis conducted in the 60's supported an increased annual allowable cut (AAC) that could be implemented within the guidelines of the sustained-yield policy in effect at the time. The increased harvest more than tripled, 20 million board feet in 1964 to 71 million board feet established under the new AAC. In order to accomplish this the main thrust through 1971 was directed at producing this harvest.

Silvicultural systems developed in the 60's for management of pine/fir/larch stands were based upon Keen's classification, Solmon and Bongberg Risk Rating and Roe's system for fir and larch. Upper elevation timber stands would be harvested using a system of staggered clearcuts.

Because risk rating and tree classification promote individual tree selection these systems as applied did not address the widespread problem of dwarf mistletoe in fir and larch. In areas with more than a light infection level the process of individual tree selection was not only increasing the infection level in the stand but was enhancing the parasites growth. The 1972 plan dealt with this problem directly by developing a mistletoe classification system for both the overstory and understory trees and applying clear-cutting, seed tree or shelterwood systems as appropriate. The goal was the eventual reduction of the mistletoe parasite to a manageable level. The tree selection system was reduced to those stands of pine/fir/larch that were disease free and those that would provide desireable regeneration under this system.

The process of harvesting upper elevation conifers using staggered clearcuts, while technically acceptable, was recognized as having negative effects. The panorama of many varied forest openings would be new to the public and clear-cutting at high elevations was felt to be environmentally and biologically sensitive.

In the period 1969-1971 an epidemic of spruce bark beetle in the Boulder and Cripple Horse Logging Units caused extensive mortality in old growth Engelmann spruce. To capture the mortality occurring in reserve stands surrounding clearcuts, the original boundaries were extended from their original design of 50 to 60 acres to encompass acreages exceeding 200 acres. Resulting tribal reaction and planting failures prompted a new policy in the 1972 plan that limited clear-cutting to 8 acres or less unless special treatments were needed or received prior approval. In addition, a policy for the modified shelterwood cutting, a system that closely approximates the seed tree method, was implemented that discouraged large blocks (25 acres or more) unless aesthetic criteria were met. Techniques to soften the appearance or screen the cutting blocks were also emphasized as mitigating measures.

Sophistication of forest development practices was primary in the 1972 plan. A permanent F.D. crew was established to carry out reforestation, timber stand improvement (TSI), fire control, and various timber sale activities. Funding to carry out TSI activities would be provided for by withholding from each thousand board feet of timber sold, a specified payment to be deposited in a special Tribal account. The withholding was called the "Purchaser TSI payment" and was to be used only for the purpose(s) they were collected for.

Refinement of forest development operations was also undertaken. In contrast to prior practice, an emphasis to contract specific projects was being promoted to employ Tribal members and reduce costs through competitive bidding. Thinning, slash treatment and reforestation were labor intensive and were projects that could be controlled through procedures and guidelines and ground layout. In-house operations such as seed collection in specific habitats, quality control of reforestation projects and the proposal of a containerized greenhouse were also being implemented. The emphasis was to eliminate the reforestation backlog and grow larger seedlings adapted to specific sites in a shorter time.

The controversy and criticism aimed at the forest road program was paramount in the minds of the agency staff during the writing of the 1972 plan. Road standards, whether they were "Forester Roads" that lay lightly on the land or "Engineers Roads" that were expensive and met rigid specifications, were addressed. Road density, probably the core of the controversy at the time, was recommended at an average spacing of 1000 feet. This varied from 1250 feet on gentle terrain to 750 feet on steep slopes (50% and over) where cable skidding is required. Other road practices for location, erosion, grade, stabilization and road closure were recommended emphasizing low cost and practicability. Most certainly these decisions were influenced by the historical lack of road maintenance on the Reservation.

In 1971 the BIA programmed $58,000 for road maintenance, until this time the largest budget ever allowed. This funding was tied to snowplowing in Tribal Homesites and the maintenance of 322 miles of BIA roads. Bridge failures or wash-outs perennialy took priority consuming a large part of the budget. Any remaining budget could be allocated to maintenance of the BIA system roads. With this limited budget, BIA administrators could provide little more than minimum grading or reshaping to a small portion of the required 322 miles. For the 5,000 plus miles of logging roads outside the BIA system, maintenance funding was not provided. With this knowledge, the writers of the 1972 plan found it imparative to recommend low initial investments and low cost stabilization and road design that would endure long periods of neglect with minimal erosion.

The importance of using controlled fire in the forestry program was brought forth in the 1972 plan. There was concern for the large fuel build-up resulting from thinning operations and past fire control activities. Prescribed fire treatment could be used to reduce this hazard. Also, the benefits of fire for site preparation was recognized. In essence the traditional concept of total wildfire control was beginning to shift towards using fire as a management tool.

In 1972, a substantial portion (approximately 10 percent) of the commercial forest acreage was occupied by lodgepole pine. Although a precise inventory was not available it was felt that most of these stands fell into categories of immature age classes or overstocked, stagnated stands. Even without knowing the extent of stand conditions it was felt essential to initiate management practices to enhance the productivity of these timber stands. It was proposed that a systematic thinning program be initiated utilizing the permit program to thin 100-200 acres annually. By coincidence the permit program was harvesting approximately 200 acres/yr in their lodgepole pine post and pole operation. Therefore, by continuing this rate of harvest it was determined that these operations would accomplish the desired objective.

TIMBER CUT

BY CONTRACT - YEARS

YEAR	*CUT W/O PERMITS	# IND. OPER.	# NON-IND. OPER.	IND. VOL.	NON-IND. VOL.	VALUE
1972	70,385	10	7	29.1	41.3	3,603,773
1973	76,869	12	8	22.4	54.4	6,436,148
1974	59,452	9	6	9.3	50.1	4,676,640
1975	38,890	10	4	9.4	29.4	2,615,064
1976	34,081	10	6	8.7	25.4	**3,287,834
1977	35,128	13	6	13.8	21.3	3,956,446
1978	37,719	11	6	8.2	29.4	5,070,119
1979	26,054	9	9	2.6	23.4	3,951,737
1980	14,489	3	9	.2	14.2	1,907,810
1981	14,225	4	10	.5	13.7	1,392,412
1982	12,888	10	8	4.6	8.3	1,070,060
1983	19,633	8	9	5.5	14.1	1,673,670
1984	31,943	5	6	4.3	27.6	3,230,518

* Amounts are in MBF (thousand board feet)

** Includes $5,349 - unauthorized cutting/movement and misc.

ECONOMICS

The sale of forest products and the forestry related employment is an important contributor to the economic well being of the Tribes and the local economy. The following table lists the income from this industry in the past ten years.

TABLE ____

ECONOMIC CONTRIBUTION OF THE FOREST RESOURCE

YEAR	1/ TIMBER SALES($)	2/ SALE OF OTHER WOOD PRODUCTS($)	3/ FOREST-RELATED EMPLOYMENT($)
1984	3,264,651	797,629	793,387
1983	1,749,203	694,166	514,528
1982	1,112,419	924,483	444,050
1981	1,451,760	867,684	642,579
1980	1,949,077	700,375	1,409,384
1979	3,994,393	361,369	1,407,376
1978	5,108,454	501,153	874,145
1977	4,015,901	354,289	989,345
1976	3,381,688	367,033	483,064
1975	2,698,675	123,694	516,452
TOTAL	28,726,221	5,691,875	8,074,310

1/ Total stumpage received by the Tribes from timber contracts and paid permits.

2/ This includes logs sold for personal use, post and poles, firewood, Christmas tree and allotment timber.

3/ This includes wages of Tribal Members.

RECORD OF CONTRACT TIMBER SALES
1972-June 1986

Logging Unit	Estimated Net Cut Volume	Actual Net Cut Volume	Contract Approval Date
Deep	15,109,000	18,651,596	02-04-72
Ferry Basin Salvage	600,000	750,170	05-01-72
McDonald	854,000	2,285,440	06-06-72
Ronan	3,832,000	5,456,890	05-03-72
2 x 4	750,000	885,140	07-24-72
Burned Cabin	1,000,000	613,880	09-22-72
Basin Salvage	180,000	693,820	10-11-72
Garceau Salvage	100,000	299,640	10-24-72
Pashua	4,994,000	2,159,540	12-26-72
Pistol Salvage	500,000	1,046,660	03-05-73
Swope	599,000	597,510	03-05-73
Valley	81,254,000	78,379,010	03-30-73
Thorn	350,000	654,390	09-14-73
Clear	9,425,000	11,716,800	01-09-74
Dempsey	320,000	314,590	01-24-74
Jammer	4,859,000	5,036,310	04-07-74
Sun-Gar Salvage	300,000	1,025,350	09-04-74
Fringe	1,950,000	1,969,370	05-01-75
Mill Pocket Salvage	500,000	414,050	05-12-75
Hot Springs	24,884,000	24,816,380	07-03-75
Welcome Spring	12,319,000	11,422,940	07-03-75
Dream	2,580,000	1,535,440	07-16-75
1056	351,000	286,970	01-16-76

Logging Unit	Estimated Net Cut Volume	Actual Net Cut Volume	Contract Approval Date
West Side Salvage	1,000,000	105,830	04-01-76
Moss Peak Salvage	1,174,000	1,343,150	04-02-76
Blue Grade	455,000	251,060	04-01-76
Hellroaring Salvage	150,000	622,210	04-19-76
South Crow II	138,000	260,470	04-20-76
Crow Flats	1,497,000	1,892,440	04-30-76
2698	205,000	368,090	06-25-76
South Crow I	459,000	472,680	11-10-76
Honey I	429,000	587,660	11-15-76
Cottonwood Fire Salvage	99,000	108,770	12-07-76
Irvine I	15,024,000	16,207,710	12-27-76
Frog	4,942,000	3,198,060	04-14-77
Clear Mistletoe	378,000	30,340	05-31-77
Magpie Fire Salvage	127,800	185,270	07-08-77
St. Marys	14,094,000	13,999,500	10-25-77
St. Marys West	9,012,000	(Terminated)	12-13-77
Mill Creek 77	475,400	546,800	01-30-78
Honey, Too	458,000	558,970	08-07-78
Vanderberg Lodgepole	160,103	160,100	07-14-78
Goldridge	1,000 (Linear Feet)	52,410 (Linear Feet)	09-18-78
Hellroaring Cedar	34,368	34,368	12-06-78
Section 7 Houselog	100,617	101,767	11-04-77
Vanderburg	71,000	89,600	03-21-79
Cottonwood Scrag	548,060	504,220	06-22-79

Logging Unit	Estimated Net Cut Volume	Actual Net Cut Volume	Contract Approval Date
Southfork Salvage	80,000	191,860	07-23-79
Garden Creek	13,411,052	14,196,110	10-03-79
Five Corners	130,000	148,600	10-04-79
Clear Mistletoe	300,000	720,180	11-06-79
Finley	14,098,000	16,640,070	11-30-79
Dog Lake	14,424,000	836,690 (Terminated)	02-15-80
Grasshopper Flats	224,000	183,150	03-05-81
1100 Road Mistletoe	243,000	345,800	04-17-81
Arlee Commercial Thinning Unit #2	100,000	173,220	04-27-81
Arlee Commercial Thinning Unit #1	100,000	288,270	04-30-81
Arlee Commercial Thinning Unit #4	100,000	205,290	04-29-81
Arlee Commercial Thinning Unit #3	100,000	209,730	05-15-81
East Fork Valley Mistletoe	325,000	365,900	06-02-81
Charity Peak	9,577,000	11,371,490	06-25-81
Mill Creek	20,638,000	19,921,480	10-01-81
Couture Thinning	21,000 (Tons)	30,073.42 (Tons)	12-05-81
Dream 82 Rehab	640,000	237,110	03-01-82
Ducharme Rehab	312,000	350,550	06-17-82
Camas Commerical Thinning Unit	14,367(Tons)	14,845 (Tons)	06-23-82
Boulder 82 Salvage (Upper Basin)	2,000,000	1,738,170	07-14-82

Logging Unit	Estimated Net Cut Volume	Actual Net Cut Volume	Contract Approval Date
Boulder 82 Salvage (Station Creek)	2,000,000	1,890,860	07-14-82
Sunny Slope Rehab 1	388,400	549,500	07-15-82
South Fork Station Creek	250,000	342,120	08-11-82
Headwaters Salvage	133,000	265,370	09-08-82
Meadow Rehab	774,000	1,411,350	04-22-83
West Boulder Ridge Salvage	963,500	2,221,390	05-27-83
East Fork Valley Salvage	1,268,000	1,039,040	06-16-83
Hot Springs Commercial Thinning	2,864 (Tons)	3,446.07 (Tons)	07-25-83
Bassoo Creek Salvage	216,000	342,350	12-06-83
Letzen Gulch	3,393,000	4,494,000	01-17-84
Lozeau Lodgepole	1,872,000	597,270	05-18-84
Snowstorm Mountain	3,710,000	2,603,250	05-21-84
Lamoose Bullpine	1,300,000	1,040,000	10-20-84
Xeric Commercial Thinning Unit	3,155.75 (Tons)	3,713 (Tons)	12-10-84
Bull Hog Commercial Thinning Unit	1,910,000	842,000	02-01-85
Whitetail	117,000	90,400	04-22-85
Alder Ditch	4,060,000	3,486,000	12-09-85
Burke Hill	795,000	863,000	01-29-86
Kicking Horse Bullpine	2,204,000		01-29-86

APPENDIX D

ECONOMIC ASPECTS OF MANAGEMENT

1. Introduction

General information about the social and economic setting on the Reservation is presented on page 11 of the Environmental Assessment.

The Reservation forest provides a vital source of Tribal and individual Indian income. Since 1978 Tribal income from forest products has dwindled proportionally with the state of the wood-products oriented economy of western Montana. 1984 was a bright spot in a recently dismal past, only because much of the volume balance on two large sales was logged to avoid contract defaults. During the past management period the annual harvest fluctuated from a high in 1973 of 73 MMBF to a low of 16 MMBF in 1981. This includes timber harvested under contract and paid permits. The total allowable cut left uncut for the last management period was 187,240 MBF. Economic supply and demand has largely determined the annual harvest and not sustained yield allowable annual cut (AAC). The contract sales will continue to fluctuate in stumpage price and volume cut with the economy.

There are several other forest-related sources of Tribal and individual Indian income. These often fluctuate inversely with the income from large sales. That is, when the local economy is depressed, many Tribal members turn to post and pole, Christmas tree and firewood cutting. 1980 through 1982 in particular were banner years for these activities.

2. Sources of Income from the Forest Resource

There are two categories of incomes. The receipts paid directly into the Tribal treasury and the individual income received by Tribal members.

The sources of Tribal income from the forest include timber stumpage payments, grazing fees, and recreation permits. The sources of individual Indian income derived from the timber resource include the sale of allotted timber, post and pole raw material, Christmas trees, firewood per capita payments, Tribal Forest Management Enterprise (T.F.M.E.), BIA employment and individual logger income. This report considers only the initial value of raw timber products as they are taken from the forest. The income derived from the resale after manufacturing of these raw materials is not considered.

a. Tribal Income from Forest Resources

Table D-1 shows how the trends of cut volumes and stumpage prices since 1972.

TABLE D-1

TOTAL SAWLOG STUMPAGE RECEIVED (CONTRACTS AND PAID PERMITS)

YEAR	1/ VOL.CUT BY IND. (MBM)	VOL. CUT BY NON-IND.(MBM)	TOTAL VOL. SOLD (MBM)	AVE. STUMPAGE PRICE ($/MBM)	2/ TOTAL STUMPAGE COLLECTED($)
1984	5,370	27,717	33,087	98.67	3,264,651
1983	7,415	14,398	21,813	80.20	1,749,203
1982	5,375	8,528	13,903	80.01	1,112,419
1981	2,565	13,842	16,407	88.48	1,451,760
1980	1,076	14,486	15,562	125.25	1,949.077
1979	3,432	23,575	27,007	147.90	3,994.393
1978	8,861	29,674	38,535	132.57	5,108,454
1977	15,411	21,404	36,815	109.08	4,015,901
1976	10,693	25,564	36,257	93.27	3,381,688
1975	13,080	29,416	42,496	63.50	2,698,675
1974	16,980	50,140	67,120	70.54	4,734,350
1973	23,094	54,786	77,880	83.10	6,471,718
1972	29,638	41,360	70,998	50.84	3,609,678

1/ Total volume includes only contract sales, paid permits and timber trespass since these are the sources of Tribal income.

2/ Figures derived by multiplying the total volume sold by the average stumpage. Rounding of the cut volume figure prevents the product from equalling the correct total value shown in this column. This also includes minor trespass payments.

In recent history stumpage income has comprised about 50 percent of the Tribal income, not including federal appropriations or grants. In the future the Kerr Dam income will be a much larger portion of Tribal income than in the past.

Grazing fees and recreation permits are the other two sources of income. Use of forest land for grazing provides approximately $60,000 annual income for 90 Tribal members and their families. Approximately 290,000 forested acres are included in the range program. The acreage is large compared to actual use by livestock.

Fees collected from the sale of recreation permits are an exchange to the public for recreation privileges on Tribal lands and waters. The following list itemizes the annual income received during the last management period.

Year	Income $
1984	87,900
1983	69,500
1982	53,671
1981	64,207
1980	29,763
1979	50,993
1978	59,674
1977	53,325
1976	29,707
1975	14,305

The low sales years correspond to recession and "energy-lean" years when the regional recreation industry was in a slump. In 1981 an extensive advertising campaign publicized the recreational opportunities and the permit requirement. The campaign accounts for much of the big increase in 1981 permit sales.

b. Individual Indian Income from Timber Resources

Tribal members receive income from the timber resource in two categories: 1) wage earnings from forestry and wood products associated employment, and; 2) sale of sawlogs and other wood products. The wage earners include permanent and temporary employees of the Tribal Forest Management Enterprise (T.F.M.E.) and the BIA; employees of the post and pole yard and area sawmills; and forest development contractors.

Until 1981, wage earners have been the larger group both in numbers employed and in income received. This is reflected in Table D-2.

Table D-2

INDIVIDUAL INDIAN INCOME FROM WAGES EARNED FROM FOREST RELATED EMPLOYMENT[1]

Date	Tribal Sources[2]	Federal Sources[3]	Total
1984	541,017	252,370	793,387
1983	268,608	245,925	514,528
1982	301,920	142,130	444,050
1981	390,474	252,105	642,579
1980	1,025,399	383,985	1,409,384
1979	1,065,127	342,249	1,407,376
1978	663,328	210,817	874,145
1977	640,308	349,037	989,345
1976	444,683	38,381	483,064
1975	413,663	102,789	516,452
1974	464,230	35,803	500,033
Total	6,218,752	2,355,591	8,574,343

---

[1] It is not possible to separate the dollars into the various employment opportunities.

[2] The sources of Tribal funding include 10 percent timber sale receipts and TSI payments.

[3] The sources of federal funding include mistletoe control funds, forest development add-on funds, reforestation/erosion control/fuel treatment, and area office forestry funds.

The second group are Indian loggers who derive income from the sale of sawlogs and other wood products. Table D-3 reflects income from these sources. Per capita payments come out of previously reported Tribal income and are not included in Table D-3.

There are two reasons for the marked increase in individual Indian income from the sale of forest products. First unemployment has forced people to revert to small free or paid permit sales and/or Christmas tree, firewood and post and pole cutting, to supplement their income. Secondly the demand for post and pole raw material has increased due to the expansion of the Flathead Post and Pole Yard.

3. The State of the Economy

The economic structure of western Montana is composed of basic and derived industries. The basic industries are export industries where income and management decisions are founded on conditions outside the state. The wood products industry and Federal Government are basic industries. The product and service industries which support these are called derivative industries. Economic impact on the basic industries has a similar influence on derived support industries.

The wood products industry in Montana's western seven counties has a dominating influence on the regional economy. It has represented about 40 percent of the earnings in basic industries for the past management period (Keegan, 1980). After the recession of the early seventies, the industry steadily gathered momentum through 1978. From 1979 three 1982, however, the combination of high inflation, high federal deficits and high interest rates plunged the national economy into another recession and caused depression-like conditions in the region's wood products industry. Curtailment and temporary shut-downs have been common. Several mills have been consolidated to ownerships with a timber land base. Because these large puchasers can rely on their timber base and not just outside timber, they have purchased less timber from the reservation than the individual mills did in the past. In addition to the consolidations at least four mills have closed that purchased reservation timber within the last ten years. This has had a marked affect on the Flathead Reservation economy. The Tribal income from contract sales and paid permits has been cut in half (comparing the two periods 1975-1978 and 1979-1982). With major purchasers gone and several others reducing their timber purchasing to a minimum it is difficult to sell timber at a price commensurate with the owner's perceived value. The three major income sources derived from the reservation are stumpage receipts, lease payments from Kerr Dam and investment income. From 1975 to 1980 stumpage receipts represented

TABLE D-3

INDIVIDUAL INDIAN INCOME OR VALUE RECEIVED FROM THE SALE OF WOOD PRODUCTS[1]

INCOME OR VALUE ($)

Date	Logs[2]	Posts[3]	Poles[3]	Firewood[4]	Christmas Trees[3]	Allotment Timber	Total
1984	869	130,000	154,000	270,000	236,250	6,510	797,629
1983	4,178	78,000	154,000	270,000	176,622	11,366	694,166
1982	275	120,000	126,000	336,000	306,355	35,853	924,483
1981	2,103	110,580	112,920	336,000	304,632	1,449	867,684
1980	4,900	134,241	120,412	213,240	176,876	50,706	700,375
1979	-	88,302	96,813	81,950	86,163	8,141	361,369
1978	2,000	57,573	45,906	100,485	133,237	163,952	501,153
1977	8,650	101,103	59,224	70,550	105,873	8,889	354,289
1976	18,703	74,260	52,479	28,500	97,050	105,041	376,033
1975	21,450	17,404	5,310	17,550	61,980	-	123,694
TOTAL							5,700,875

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[1] Does not include a large unknown income Indian loggers receive from sawlog sales.

[2] Value of sawlogs cut for personal use.

[3] Based on raw material purchase price.

[4] Based on average retail value.

about half of the Tribal income. During 1980 and 1981 stumpage accounted for only one quarter of the Tribe's income. This decrease in timber harvesting and resultant income decrease is the main reason for the cuts in the Tribal Forest Management Enterprise (T.F.M.E.). The difference has been made up by higher interest income from Tribal investment capital and in 1979 lease payments increased on Kerr Dam from $950,000 to $2,600,000.

Businesses supplying goods and services such as clothing, applicances, specialties and entertainment, etc. are sagging too. These support or derivative businesses flourish or perish from the disposable income of those employed by the basic industries. Since the wood products industry employs so many, support industries are suffering too. For example, the T.F.M.E. Program, which is funded by a percentage of the stumpage receipts, lost 14 of the 25 permanent employees since 1980. However, Indian woods product employees and support business on the reservations haven't been as severely affected as in the surrounding counties. There are several reasons for this. Previously mentioned are the alternative wood products employment opportunities available to Tribal members and the Flathead Post and Pole Yard expansion. Another reason is per capita payments to Tribal members have decreased only slightly during the last management period.

The economics of future forest management here offers a real administrative challenge. Though the staff and budget have been cut, adequate forest management has been maintained because timber harvest remains low. If timber harvest returns to normal it may be impossible to fulfill the quantity and/or quality of our forest management trust responsibility, without additional staff.

4. Market, Management, and the Future

The wood product industry is ready to increase output. The demand is there. Inflation is under control. The last hurdle seems to be high interest rates. Unfortunately this is as much a political question as it is an economic one. The Federal Reserve is unwilling to drop the prime lending rate significantly until the Federal Budget is in a semblance of balance. If interest rates drop significantly the wood's products industry would thrive.

In the timber industry the trend is toward small sawlog utilization. Most of the future logging will be in cutover stands where the average diameter is smaller than in the virgin stands. The logs from these stands are less valuable than equal volumes of old growth timber. However, this loss of value will be at least partially offset by the increase in volume growth by the younger more vigorous trees. Prices are cyclic of course, however, most forest economists believe that world wide demand for timber will tend to outstrip supply resulting in increasing stumpage value.

A relatively new market for the Tribe is hog fuel. This has developed because Champion International has converted from natural gas to hog fuel to fire its boilers. Two cautions must be understood about this market. First, at this time Champion is the only customer for hog fuel in this area. The second caution is that hog fuel production in the woods appears to be a near break-even endeavor. If suppliers are not profitable then either Champion will either have to raise their purchase price or the Tribe's market would be lost. This would be unfortunate because hog fuel loggers may pay stumpage for low value stands that there is little demand for. Yet many of these stands have high priority for harvesting because they occupy good growing sites and are not growing at full potential due to over-stocking. Demand for hog fuel from the woods is inversely related to the volume of hog fuel produced as a residue from sawmills.

Pulp logs and sawlog by-products are basic ingredients of the chip market. Future chip supply on the Reservation will remain tied to the sawtimber market. New technology has been developed to separate pulp chips from hog fuel. This process is not being used in western Montana yet. However, if it is introduced it should strengthen both the chip and hog fuel markets.

The post and pole industry has not been a source of Tribal income, but is a very important source of individual Indian income. The Flathead Post and Pole Yard presently provides 23 man-years of employment and an undetermined amount of employment to post and pole loggers annually. Because of expansion and growth at the post yard, future employment and income appears promising. Products manufactured include farm post and poles, a full line of treated decorative fencing, utility poles, grape stakes and tree props, and ties, and timbers. Also being considered is the addition of a scrag mill which could open up new market oportunities. These products are tied to the urban-suburban land-scaping and agricultural markets; rather than the construction industry. With the present markets and increased product diversity, this enterprise should continue stable growth for the next few years. The increase diversification could also mean greater utilization and management opportunities in lodgepole pine stands since raw material requirements now range from 2.5-inch to approximately 12-inch DBH.

The recent plant expansions have required Tribal capitalization to keep the enterprise solvent. As the post yard begins to make a profit, a percentage of the enterprise's net profits could become another source of Tribal income.

As discussed earlier, Christmas tree activities have increased sharply with the advent of the recession. In 1981;

67,696 bales of Christmas trees were harvested from the reservation have had an estimated retail value of $4,000,000. Out of this, Tribal tree cutters received $304,632 and the Tribes received nothing. A Christmas tree marketing proposal to recover the wholesale value of at least some of the trees is being pursued by the Tribal Forest Management Enterprise.

The increase in the lease payment for Kerr Dam approved in 1985 to $9,000,000 will lower the percentage of Tribal income derived from the forest. However, it seems likely that employment and income from the Reservation forest will continue to be an important component of the Tribes' future diversified economic base.

APPENDIX E

FIVE YEAR TIMBER SALE PLAN
CY 1986 - CY 1990
NET VOLUME (MMBF)

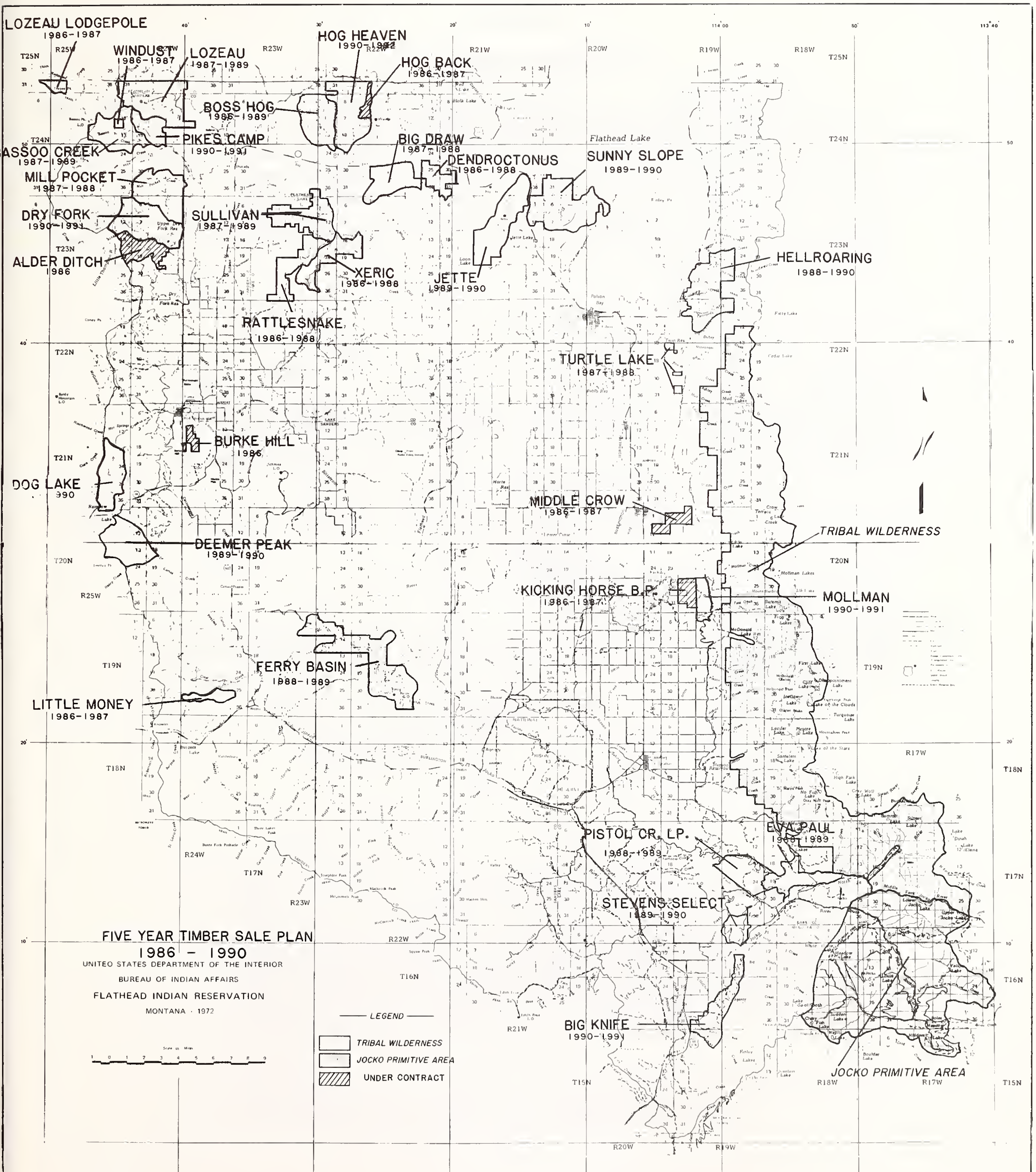
Prepared 6/25/86

YR	TIMBER SALES UNDER CONTRACT	TOTAL VOLUME	1986	1987	1988	1989	1990
	Alder Ditch	3.5	3.5				
	Burke Hill	.8	.8				
	Kicking Horse B.P.	2.2	1.0	1.2			
	Middle Crow	1.1	.4	.7			
	Hog Back	4.2	2.0	2.2			
	PROPOSED SALES						
86	Windust	1.0	.2	.8			
	Boss Hog	15.0	0	5.0	5.0	5.0	
	Bassoo Creek	11.0		3.0	4.0	4.0	
	Xeric	5.8	1.0	2.8	2.0		
	Dendroctonus	4.5	0	2.5	2.0		
	Little Money	1.0	0	1.0			
	Rattlesnake	2.0	0	1.0	1.0		
	Lozeau LP.	1.0	0	1.0			
87	Lozeau	10.0		2.0	4.0	4.0	
	Sullivan	6.0		2.0	2.0	2.0	
	Big Draw	4.0		2.0	2.0		
	Mill Pocket	6.0		3.0	3.0		
	Turtle Lake	1.6		.6	1.0		
PERMITS AND SALVAGE			2.0	2.0			
	TOTAL		10.9	32.8			

YR	PROPOSED SALES	TOTAL VOLUME	1988	1989	1990	1991	1992
88	Hellroaring	8.3	3.0	3.0	2.3		
	Ferry Basin	2.0	1.0	1.0			
	Eva Paul	4.0	2.0	2.0			
	Pistol Cr. Lp.	4.0	2.0	2.0			
89	Sunny Slope	5.0		2.0	3.0		
	Dog Lake	7.0		3.0	4.0		
	Stevens Select	3.0		1.0	2.0		
	Deemer Peak	5.0		2.0	3.0		
	Jette	5.0		2.0	3.0		
90	Hog Heaven	9.4			3.0	3.0	3.4
	Big Knife	4.0			2.0	2.0	
	Pikes Camp	6.0			3.0	3.0	
	Dry Fork	5.0			2.0	3.0	
	Mollman	1.9			.9	1.0	
PERMITS AND SALVAGE			2.0	2.0	2.0		
	TOTAL		36.0	35.0	30.2		

These projected annual harvest levels assume:

adequate BIA and TFME staffing, all timber sales will sell, and all sale contracts will be performed



FIVE YEAR TIMBER SALE PLAN

1986 - 1990

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF INDIAN AFFAIRS

FLATHEAD INDIAN RESERVATION

MONTANA · 1972

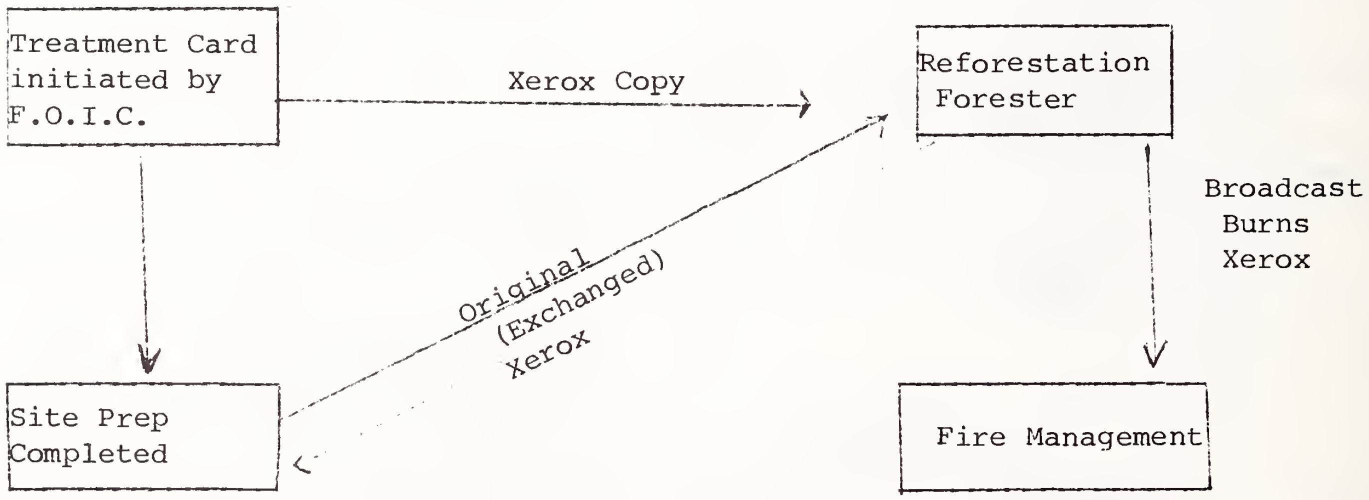
LEGEND

☐	TRIBAL WILDERNESS
☐	JOCKO PRIMITIVE AREA
▨	UNDER CONTRACT

APPENDIX F

TREATMENT CARD ROUTING

The even-age treatment card (yellow card) should be filled out as completely as possible by the Timber Sale Administrator when the block is laid out. A xerox copy of both sides is then sent to the Reforestation Forester and the yellow original is maintained by the Sale Administrator. When site preparation is complete, the yellow card is up-dated and exchanged for the xerox copy with the Reforestation Forester. The Reforestation Forester will send a xerox copy of blocks to be broadcast burned to the Fire Management Section.



APPENDIX G

INDIAN LOGGER CERTIFICATION FORM

FOR USE IN DETERMINING ELIGIBILITY FOR INDIAN PREFERENCE BIDDING ON CONTRACT TIMBER SALES UNDER 5 MMBM, IN ACCORDANCE WITH TRIBAL RESOLUTION NO. 85-132.

NAME : ______________________________

ADDRESS: ______________________________

DATE : ______________________________

I ______________________________ hereby request certification as an Indian logger.

	YES	NO
1) Personal Qualifications:		
A) I am an enrolled member of the Confederated Salish and Kootenai Tribes.	___	___
B) I am 18 years of age or older.	___	___
C) I am directly involved in the daily operation of a logging business. State your involvement in a logging business.	___	___

____

____

____

	YES	NO
D) If I am awarded a timber sale I will sign the Contract (Form 5-5324) as the Purchaser.	___	___
E) I have the necessary financial resources to meet performance bonding requirements. State what manner of bond will be used and where bond will be obtained.	___	___

____

____

2) Equipment Requirements:

The prospective Indian Preference bidder must show that he has the equipment to execute the contract. Proof of equipment availability must be provided the Superintendent, Flathead Agency prior to the advertised time of bid opening. Acceptable proof of equipment availability may include but not limited to, lease agreements, contracts for lease with a purchase option, bills of sale, titles, receipts, cancelled checks, etc. Lease and lease-purchase agreements may be conditional upon approval of the contract but the terms of the lease or lease-purchase agreement must provide for equipment availability throughout the life of the contract being advertised. The proof of equipment availability must include the equipments present location and grant permission to the Superintendent to visually inspect the equipment listed. The equipment must be operable and must be used on the timber sale being advertised.

The prospective Indian logger must supply the preceding information and also make arrangements with B.I.A. Forestry for equipment inspection. A trained operator must be present to demonstrate if the equipment is operable.

2) (Continued)

Equipment Check List

Type of Equipment	Number Available	Serial Numbers	FOR AGENCY USE ONLY Availability Status	Mechanical Condition
a. loader (cable or hydraulic)	______	______	______	______
b. track mounted skidder	______	______	______	______
c. log truck (GVW over 38,000 lbs.)	______	______	______	______
d. rubber-tired skidder	______	______	______	______
e. jammer or related cable skidder	______	______	______	______
f. horses on sales under 500 MBF	______	______	______	______

Inspector(s)________________

Date(s)____________________

3) I wish certification in the following category:

Category I Sales - 499 MBF and Less. ________

a. 1 or more units of major equipment available.
b. Equipment may be leased outright, lease-purchased or owned.

Category II Sales - 500 MBF - 1.99 MMBF ________

a. 2 or more units of major equipment available.
b. Equipment must be lease-purchased or owned.

Category III Sales - 2 MMBF - 5 MMBF ________

a. 3 or more units of major equipment available.
b. Equipment must be lease-purchased or owned.

4) The Superintendent, Flathead Agency, Pablo, Montana reserves the right to check on any information given in this form. This may involve; telephone calls, personal discussions, letters or any other means deemed necessary by the Superintendent to verify qualification. *The Superintendent also reserves the right to require re-certification of Indian Preference Bidder status at his discretion.

By signing this certification form, I hereby proclaim that all information I have provided herein is true and that I will abide by all requirements stated herein.

SIGNED:______________________________ DATE:_______________________
Indian Preference Bidder

WITNESS:______________________________ DATE:_______________________

I have verified the equipment and information provided and find that all personal qualifications and equipment requirements have been satisfied. Therefore, I hereby certify __________________________________ as an Indian Preference Bidder on Category __________________________Sales.

CONCUR:______________________________ DATE:_______________________
Forest Manager

SIGNED:______________________________________ DATE:_______________________
SUPERINTENDENT, FLATHEAD AGENCY

APPENDIX H
Wildlife Data and Studies

1. Winter Wildlife Surveys
   Helicopter surveys have been conducted each winter beginning in January 1977. All observations of animals are recorded not only by management units but by drainage. Survey intensity varies by year depending upon weather and funding. Data are compiled now by species for each management unit and by observation. Maps of the winter big game ranges are available in the Branch of Wildlife Office.

2. Mountain Goat Surveys
   Fall classification surveys for mountain goats were made in 1977 and 1978. A winter range survey for mountain goats was made in March 1979. Montana Department of Fish Wildlife and Parks occasionally conducts classification counts of mountain goats in the Mission Mountains.

3. Elk Study
   In February 1979, three elk were radio-collared on the Pistol Creek winter range These data and the information from an elk immigrating from the Stevensville area, have provided excellent information on movements in the Jocko drainage.

4. Mule Deer Study
   A University of Montana student, R. Yeager, conducted a winter habitat use project for the mule deer on the Garceau Gulch winter range. B.I.A. radio-tracked the deer to their summer ranges. The master's thesis was completed in 1984.

5. Bighorn Sheep
   In January 1979, the Reservation received 25 bighorn sheep from Wildhorse Island. Fifteen were transplanted to the Perma area immediately; the other 10 plus their 5 young were transplanted to North Crow Creek in July. Data are available on these transplants of movements, productivity and survivorship.

6. Bears
   All bears handled during control actions are marked and measured. A 3-year study of grizzly bears on the Flathead Reservation was conducted by C. Servheen, Border Grizzly Project. This project has been continued by B.I.A. and Tribal wildlife personnel. These data and several reports are available.

7. Flathead Hydropower Study
   During the course of the Army Corps of Engineers hydropower study on the Flathead River data were collected on waterfowl, big game, and raptors by Reservation and U.S. Fish and Wildlife Service Personnel. These data are on file.

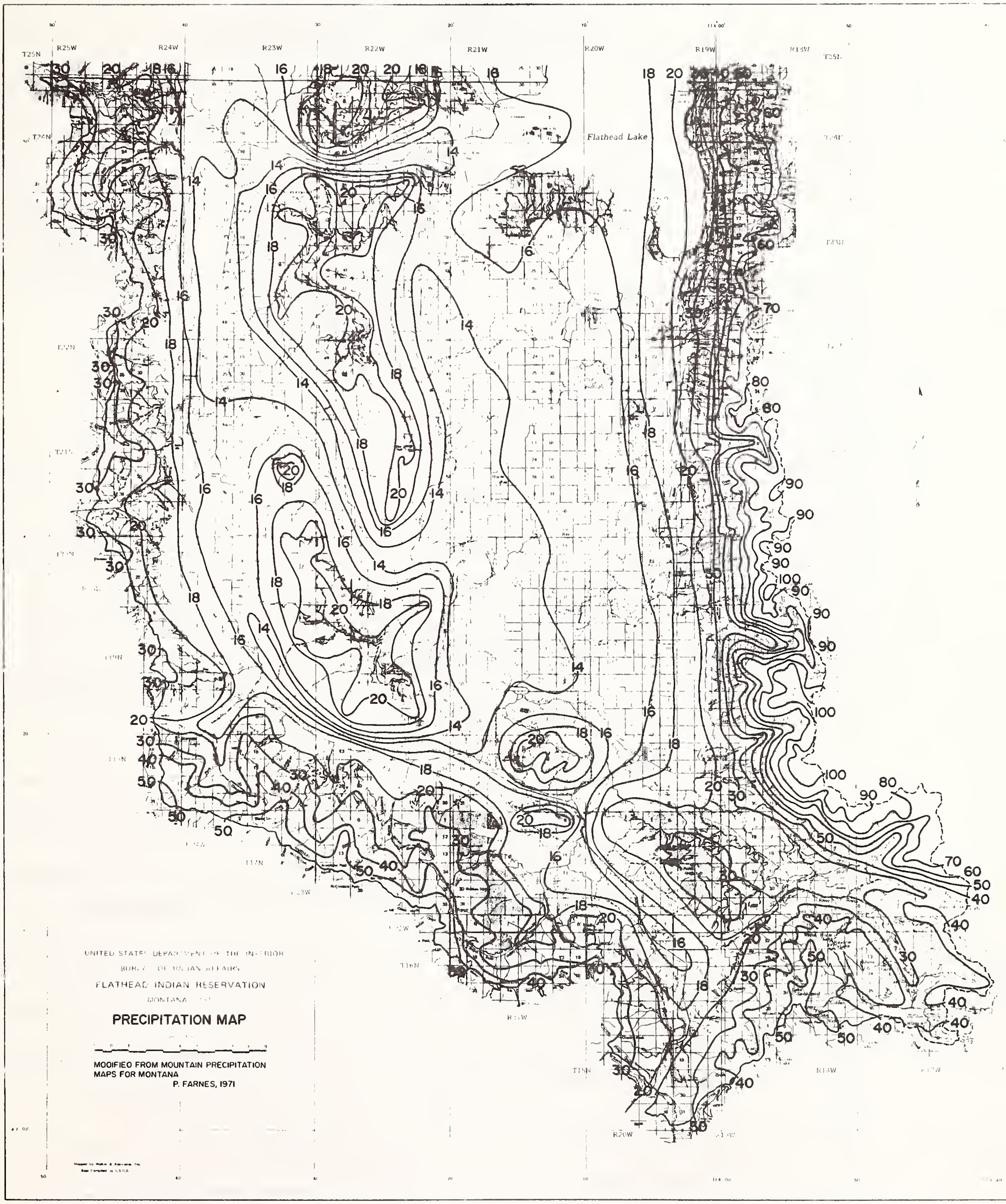
8. Breeding Bird Surveys
   Two U.S. Fish and Wildlife Service Breeding Bird Survey routes are on the Reservation. M. Bishop conducted spot mapping at Pincy-Bird Slough. Game Bird production surveys were conducted in 1974 and 1977.

9. Ospreys
The MacCarter brothers conducted osprey surveys on Flathead Lake for 10 years. B.I.A. and F.W.S. personnel continued these surveys and began surveys on Flathead River. These data have been published in the Murrelet.

10. Bald Eagles
Reservation staff have participated in all National Wildlife Federation winter bald eagle surveys except one. B.I.A. staff helped to organize the first Flathead Basin fall census. Data are available on winter bald eagle use of the Reservation in 1979-80.

11. Golden Eagles and Prairie Falcons
Maps are available of known and suspected nest sites for these two raptors.

APPENDIX I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Flathead Lake
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R20W
R13W
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
FLATHEAD INDIAN RESERVATION
MONTANA
PRECIPITATION MAP
MODIFIED FROM MOUNTAIN PRECIPITATION MAPS FOR MONTANA
P. FARNES, 1971
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APPENDIX J

SALISH & KOOTENAI CULTURE COMMITTEES
REQUEST FOR CULTURAL RESOURCE SURVEY

Director

Patricia Hewankorn - Kootenai
Clarence Woodcock - Salish

Advisors

Johnny Arlee - Salish
Patrick Lefthand - Kootenai

Committees

Salish	Kootenai
Dolly Linsebigler	Betty Nichols
Tony Incashola	Sarah Bufton
Agnes Vanderburg	Nancy Joseph
John Peter Paul	Sophie Matt
Christine Woodcock	Clarinda Burke
Charles McDonald	
Myrna Chief Stick	
Lucy Vanderburg	

File No.________________

Requested by: (Department or Program)______________________________

Address____

Telephone____

Location: (General Area)_______________________________________

Section:____________ Township:____________ Range:____________ Lot:____________

Site Description (Be thorough and explicit)______________________________

____

____

____

____

The following Cultural, religious or historical items were encountered, by the________________________office.____________________________

____

____

The type of activity this office will be doing in the above described area____

____

____

The date activity will begin ______________________________.

Additional Comments: ______________________________

Your site survey would be appreciated on on or before ______________ 19____

REQUESTED BY: (Name & Title)

____

Date ______________________________

Date Rec'd ______________________________

By ______________________________

SKETCH MAP OF SITE

(1) Indicate North (2) Indicate prominent terrain features.

APPENDIX K

THE CONFEDERATED SALISH AND KOOTENAI TRIBES
OF THE FLATHEAD RESERVATION
FORESTRY ENTERPRISE
BOX 235
RONAN, MT. 59864

TRIBAL FOREST MANAGEMENT ENTERPRISE

The express purposes of the Enterprise is to develop and administer forest management activities, to enhance the benefits of tribal members and to increase the value and productivity of the forest lands within the exterior boundaries of the Flathead Indian Reservation. These purposes will be attained by and through the Memorandum of Understanding between the Bureau of Indian Affairs and the Tribes. Through the development of the Enterprise and the Memorandum of Understanding the Tribes have a competent and knowledgeable forestry staff which assists the Bureau of Indian Affairs, Branch of Forestry, in all forest management activities on the Flathead Indian Reservation.

PROGRAM DIRECTORY

Name:	Tribal Forest Management Enterprise
Purpose:	To develop and carry on forest management activities, to enhance benefits to tribal members and increase the value and productivity of forest lands within the exterior boundaries of the Flathead Indian Reservation.
Date Established:	April 14, 1973 - Resolution #4417
Date to be Completed:	On going
Advisory Bodies, if any:	Tribal Council, Bureau of Indian Affairs - Forestry
Members of Advisory Body:	Tribal Council
Location of Program Offices:	Forestry Warehouse - Ronan, Montana
Phone Number:	(406) 676-3755 or 676-2550
Program Director:	George K. DuCharme
Staffing Pattern:	(Attached)
Funding and Source:	Ten percent of all fees collected from timber sales, permits, and trespass; purchaser TSI payments based on volume of green timber scaled; fees collected from the State of Montana for protection of state and private land within the boundaries of the Reservation; federal contracts; all interest earned through each forestry account; seedling sales.
Long Range Goal:	Forest management that will sustain total forest production at a level commensurate with area economics and capabilities which are compatible with minimum environmental impacts.

GEORGE K. DuCHARME	DIRECTOR
Sheila M. Garrison	Office Manager, Accounting, Payroll
Roberta J. Fyant	Clerk/Typist, Bookkeeper, Payroll (Fire Control)
Barbara A. Niemeyer	Clerk/Typist, Receptionist
Jerry A. Orr	Forest Technician - Timber Sales/Pre-Sales (Section Head)
Lorrene M. Gould	Forest Technician - Timber Sales/Pre-Sales
Louis Caye, Jr.	Forest Technician, Trainee - Timber Sales/Pre-Sales
Thomas E. Orr	Forest Technician - Permit Officer (Section Head)
Rick D. Clary	Forest Technician - Permits
John P. Conko	Forest Technician - Permits - LLP Management
L. Alvin McClure	Forest Technician - Permits
Kenneth E. Trickey	Forest Technician - TSI Contract Officer (Section Head)
James J. Finley	Forest Technician - TSI/Reforestation
Douglas C. Branson	Forest Technician - TSI/Reforestation
Alan L. Grenier	Forest Technician - Erosion Control/Road Closure (Section H
Robert L. McCrea	Forest Technician - Fire Management (Section Head)
William M. Fisher	Forest Technician - Greenhouse Manager
Lloyd M. Burland	Warehouse Maintenance - Permanent, Part-Time

TR - LEVEL

ADMINISTRATION	Director TR-24	Office Manager TR-15	Clerical TR-09
		Fire Management - Accountant TR-11	

TIMBER SALE ADMINISTRATION/INVENTORY	TR - (19) (14 - vacant) (11) (11)	
* Hot Springs	TR - (14 - vacant)	
ROAD CLOSURE	TR - (19)	
* Seasonal Crew	TR - (09) Crew	
TSI - REFORESTATION	TR - (19) (14) (11) (11 - vacant)	
* Seasonal Crew	TR - (14) Crew Boss	TR - (09) Aide
PERMITS	TR - (19) (14) (11) (11)	
GREENHOUSE	TR - (19)	
* Seasonal Crew	TR - (07) Crew	
FIRE MANAGEMENT	TR - (19)	
* Seasonal Crew	TR - (14) Crew Boss	TR - (09) Aide
* SURVEYING	TR - (19)	
* WILDLIFE MANAGEMENT	TR - (14) (11) (11)	

Upon receiving Associate of Applied Science Degree for Technician School, employee will receive a two-step within grade increase.

PROMOTIONS

1. Additional responsibilities that will be written into next higher position description as needed and has met required qualification standards.
2. New positions that could be needed within the organization.
3. Merit promotion within a specific section.
4. Vacancies - by promotions, transfer, or resignation.
5. Step increases are not automatic. Increases will be dependent upon the employee's performance and whether funds are available.

* Employees are hired as dictated by work load. These employees are budget dependent.

TRAINING

(Technician)

1.	Forest Technician School	Optional
2.	Management by Objectives	Optional
3.	Introduction to Supervision	Required
4.	Increasing Supervisory Effectiveness	Required
5.	Supervision and Group Performance	Required
6.	Habitat Typing	Required
7.	Fire Training	Required
8.	Understanding and Managing Human Behavior	Optional

(Secretarial)

At the present time there are no required courses. However, there are various training courses that they can be enrolled in depending upon the needs of the employee and the Tribes.

QUALIFICATION STANDARDS

TR - 07 TRAINEE --

Must have some knowledge of Forestry.

TR - 09 AIDE --

High school diploma or equivalency.
One year Forestry related training.

TR - 11 TECHNICIAN --

Minimum of two years at TR-09 level or one year at the TR-09 level and Associates of Applied Science Degree.
Habitat typing - certificate.
Supervisory training - 80 hours.
O.J.T. marking (80 hours minimum) or certificate.
O.J.T. cruising (80 hours minimum) or certificate.
Fire training - certificate.
Scaling certificate.
Knowledge of map and photo interpretation.

TR - 14 TECHNICIAN --

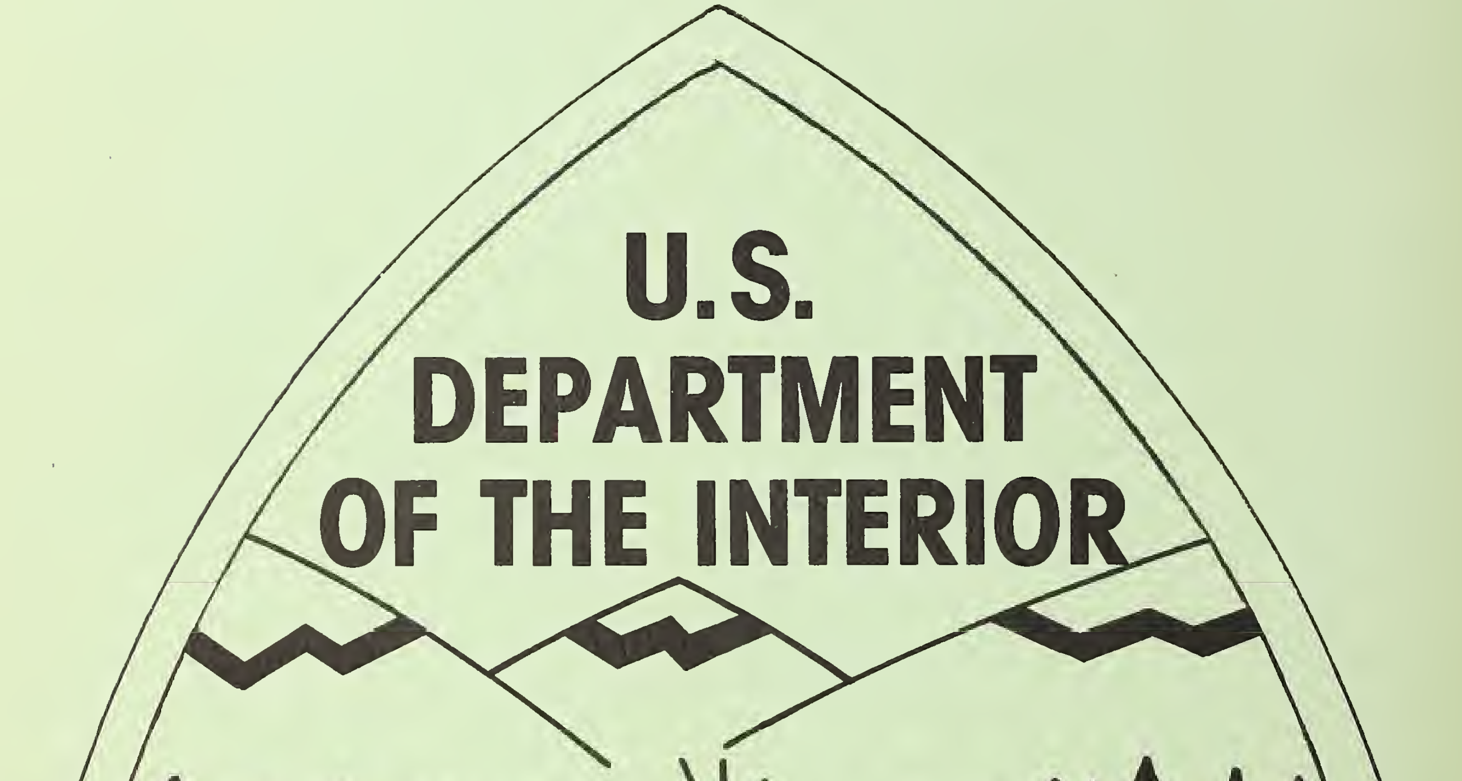
Minimum of two years at the TR-11 level.
One year post high school, Forestry related or 360 hours training, Forestry related, and four years practical experience, Forestry related.
Habitat typing - certificate.
Cruising - certificate.
Supervisory training - 120 hours.
Scaling - certificate.
Fire training - certificate.
Marking experience - 80 hours.
Map and photo interpretation.

TR - 19 TECHNICIAN --

Minimum of two years at the TR-14 level.
Habitat typing - certificate.
Cruising - certificate.
Marking experience - 80 hours.
Fire training - certificate.
Scaling - certificate.
Supervisory training - 60 hours.
Two years post high school, Forestry related.
360 hours Forestry related training.
Six years practical experience, Forestry related, or B.A. degree and two years practical experience.

TR - 24 ADMINISTRATION --

Associate of Applied Science Degree.
Six years practical experience, Forestry related.
Four years practical experience, Administrative.
Supervisory and management training - 200 hours.
Business management training - 120 hours.


U.S.
DEPARTMENT
OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
FORESTRY